Maths Calculation Policy

To support in conjunction with White-Rose Maths

Alderman's Green

Pride Resilience Kindness Responsibility Collaborate

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Section 1: Maths Calculation Policy

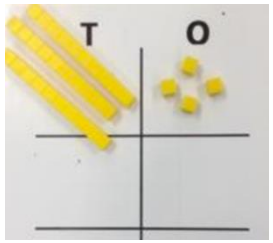
This calculation policy supports the White Rose maths scheme we follow as our main scheme throughout the school. Progression within each area of calculation is in line with the programme of study in the 2014 National Curriculum. This calculation policy should be used to support children to develop a deep understanding of number and calculations. This policy has been designed to support children's learning using concrete, pictorial and abstract representations.

• Concrete representation— a pupil is first introduced to an idea or skill by acting it out with manipulatives. This is a 'hands on' component using manipulatives and is a foundation for conceptual understanding.

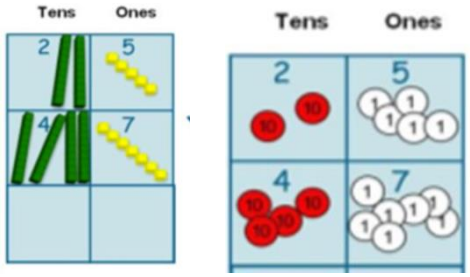
• Pictorial representation – a pupil has sufficiently understood the 'hands on' experiences performed and can now relate them to representations, such as a diagram or picture of the problem.

• Abstract representation—a pupil is now capable of representing problems by using mathematical notation, for example 12 x 2 = 24.

It is important that conceptual understanding is supported using representations to help secure understanding across the four operations. Reinforcement is achieved by going back and forth between these representations to help develop mastery.



Concrete



Pictorial

	Th	H	T	O
	5	7	0	2
+	1	2	5	
	6	9	5	2

Abstract

Section 2: How to use this calculation policy?

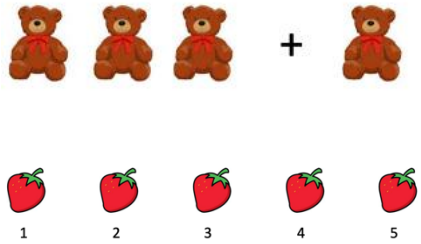
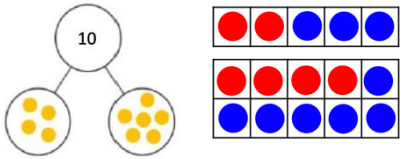
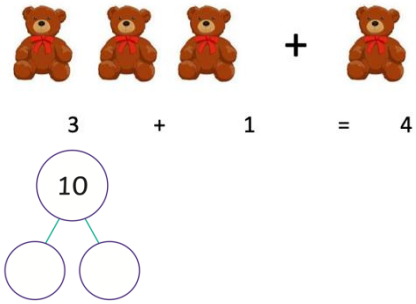
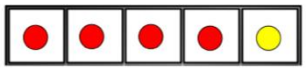
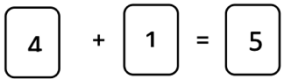
This calculation policy is a guide for all staff at Alderman's Green and has been adapted from work by the NCETM and White Rose. All teachers have been given access to the White Rose Maths Premium resources and are required to base their planning around their year group's modules. These modules are affiliated to the workings of the 2014 Maths Programme of Study. The policy does not recommend one set of manipulatives over another, rather that, a variety of manipulatives are used to help embed a CPA approach while supporting the teaching of mastery to allow children flexibility and fluidity to move between different representations and contexts of Maths. For each of the four operations of number, different strategies are laid out, together with examples of what concrete materials can be used and how, along with suggested pictorial representations to ensure a consistent approach through the school. The principle of the concrete-pictorial-abstract (CPA) approach [Make it, Draw it, Write it is for children to have a true understanding of a mathematical concept, they need to master all three phases within a year group's scheme of work.

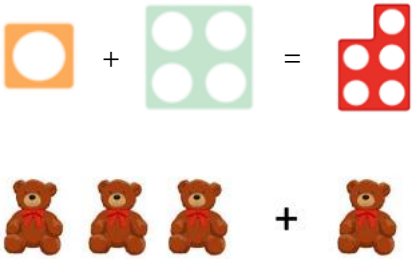
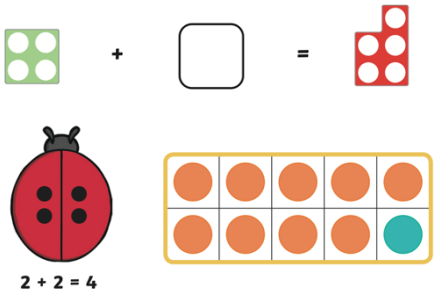
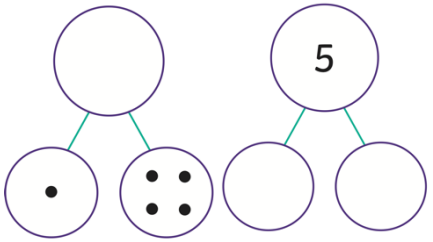
Section 3: How do we teach Maths at Alderman's Green?

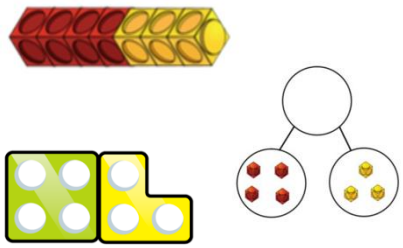
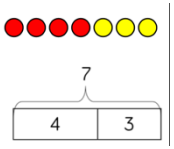
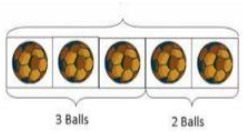
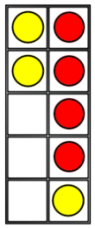
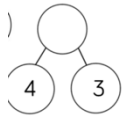
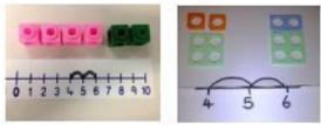
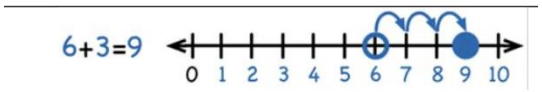
At Alderman's Green our curriculum intent is to ensure our children have the opportunity to talk, feel, question and reflect on their learning, this is also applicable to their mathematics learning journey. As a mathematician at Alderman's Green, we provide children creative and engaging lesson that will give them a range of opportunities to explore mathematics. We give all children a chance to feel a sense of achievement in Maths through our Bronze, Silver Gold approach underpinned by CPA approach in lessons. Through using the 'Rosenshine principles in action' approach, linked with the White Rose small steps, it helps us to develop a learning journey where children activate prior knowledge and new material is introduced in small steps with models and scaffolding for guided student practice. Before moving onto independent practice, AFL techniques (hinge questions etc) are used to check children's understanding and ensure any misconceptions are addressed. Learning is revisited on a weekly and monthly review through morning activities, maths starters and the spiral curriculum approach we take to our Maths learning. Through feedback children are able reflect on their achievements and are given ongoing opportunities to understand the next steps in their individual learning journey.

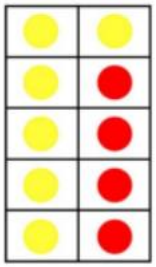
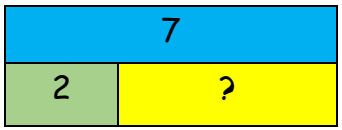
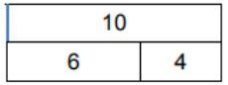
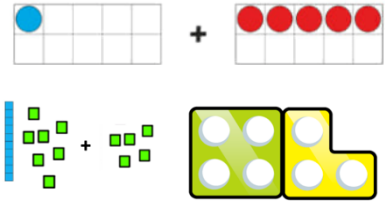
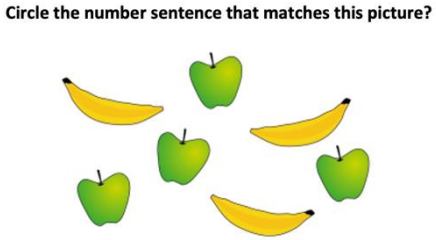
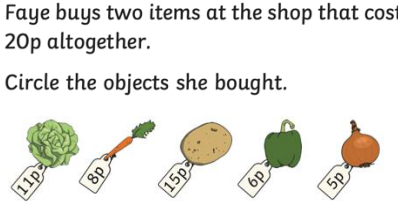
Through our spiral curriculum, learning is taught in shorter blocks where it is revisited and built upon through the academic year based on on-going assessment for learning. Staff use this knowledge to provide children to make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly challenging problems.

Section 4: Addition at Alderman's Green

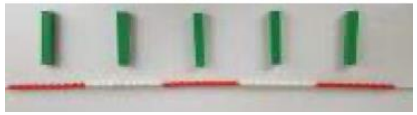
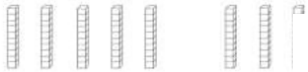
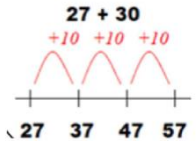
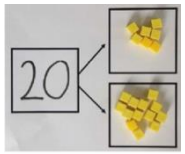
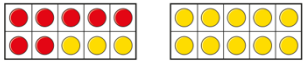
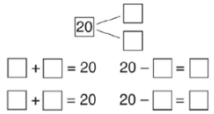
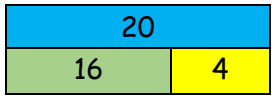
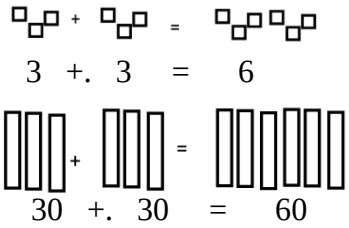
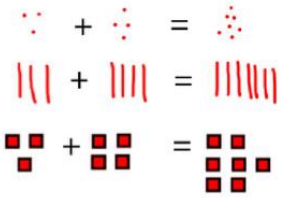
Key Vocabulary to be taught and rehearsed	sum, total, plus, add, altogether, and, more is equal to, is the same, double, parts and whole, how many more to make? How many more is…. than…?		
EYFS Objectives Addition	**Concrete**	**Pictorial**	**Abstract**
Have a deep understanding of numbers to 10 including the composition of each number. 			
Say a number that is one more than a given number.  BBC iPlayer – one more	 	 *One more than 4 is 5.* 	  One more than 4 is 5

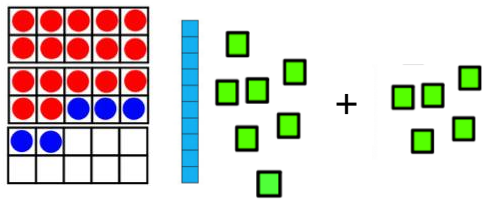
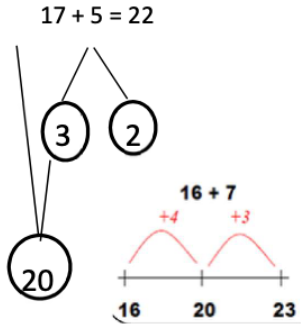
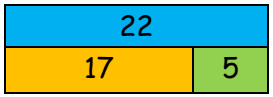
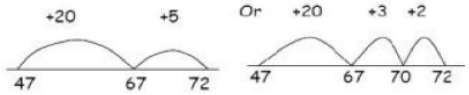
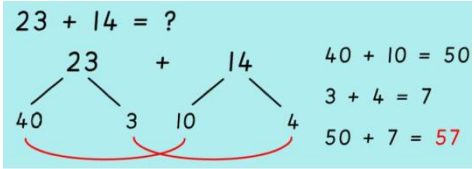
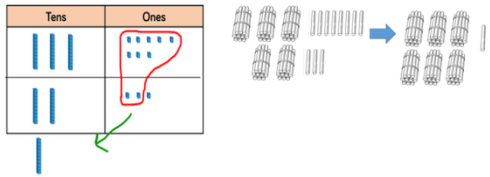
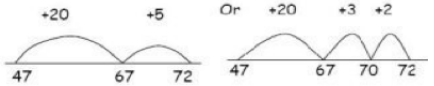
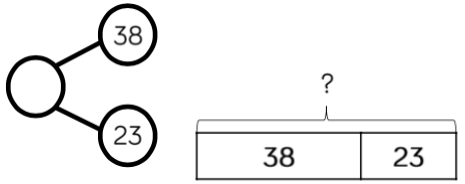
Automatically recall number bonds up to 5 some up 10, including double facts  BBC iPlayer – double trouble			

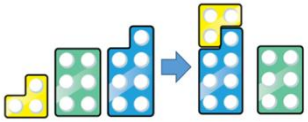
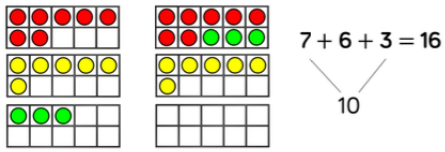
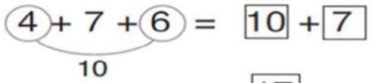
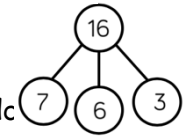
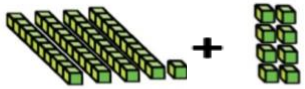
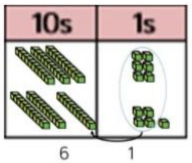
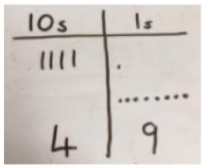
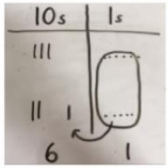
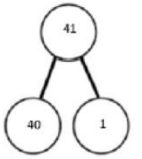
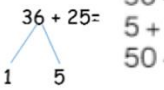
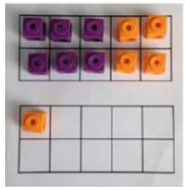
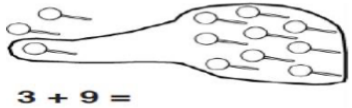
Key Vocabulary to be taught and rehearsed	**Add, addition altogether, sum, total, more, commutative, number facts/bonds. whole number, partition, is the same as / equal to, tens and ones, part-part whole, number bonds, number facts. Near double, double, one more, two more… ten more. How many more to make? How many more is …. than…? How much more is….?**		
Year 1 Objectives	**Concrete**	**Pictorial**	**Abstract**
Read and interpret mathematical statements involving addition Write mathematical statements involving (+) and equals (=)		Use of pictures to add two numbers together.   	4 + 3 = 7 7 = 4 + 3  Include missing number questions to develop varied fluency. 7 =? + 3
Start at the biggest number and count on (Use of bead strings, numicon and cubes) Addition and subtraction of one-digit and two-digit numbers to 20 including 0.	  Start with largest number on the bead string and then count on to the smaller number 1 by 1 to find the answer.	Start with largest number on the number line and count on in ones to start with to build confidence  	**5 + 12 = ?** Start with the largest number in your head and count on the smaller number to find your answer.

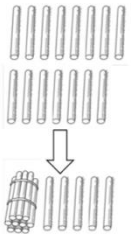
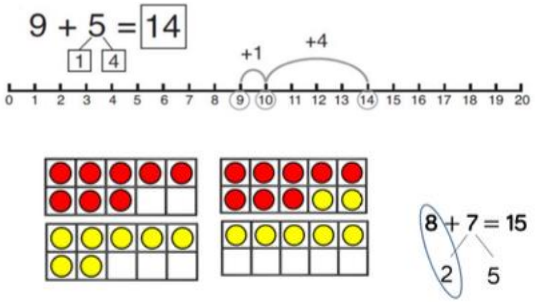
Represent & use number bonds and related subtractions facts within 20.	 6 + 4 = 10 4 + 6 = 10 10 – 4 = 6 10 – 6 = 4 Tens Frame	Use of bar modelling to support related number facts within 20 ensuring appropriate representations of the bar.  7 = 5 + ___ 2 + ___ = 7 7 = 5 - ___. 7 - ___ = 2	Include missing number questions  6 + 4 = 10 4 + 6 = 10 10 – 4 = 6 10 – 6 = 4
Solve one-step problems that involve addition using concrete objects and pictorial representations, and missing number problems such as 7 =__ + 4 .	Use of ten frames, diennes, counters and cubes to supprot conceret approach. 	 3 + 3 = 6, 8 = 4 + 3, 4 = 3 + 1, 4 + 3 = 7	

Addition calculations must be represented with a missing number problem and different layouts to ensure children become develop automaticity in their key numbers e.g., 4 + ___ = 7 7 = 3 + ____

Key Vocabulary to be taught and rehearsed	**addition, more, and, plus, altogether, sum, total, increase, partition, inverse operation, number facts/bonds missing number regrouping, tens boundary, exchange, is the same as/ equal to, par, part whole, bar modelling, commutative, double, near double, how many more to make? How many more is …. than…? How much more is….?**		
Year 2 Objectives	**Concrete**	**Pictorial**	**Abstract**
To add multiples of 10 (Diennes, Beads strings or Numicon)	30 + 20 = 50 or 50 = 30 + 20 	 5 tens + 3 tens = 50 + 30 = 	20 + 30 = 70 = 50 + 20 40 + ___ = 80 60 = 20 + ____
To use known number facts. (Part, part whole, ten frames and numicon)	Children explore ways of making numbers within 20  	Explore fact families within 20. Developing Fluency in these facts.  	Explore the commutativity of addition by swapping the addends to build a fact family. Explore the concepts of the inverse relationship of addition and subtract and use this to check calculations. 
To use known facts (diennes and ten frames to support)		Children to draw Representations of hundrends, tensand ones. 	3 + 4 = 7 LEADS TO 30 + 40 = 70 LEADS TO 300 + 400 – 700 (Ensure discussion involves understand how the number is get bigger and by how many?)

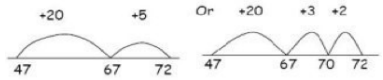
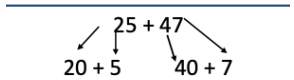
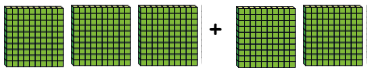
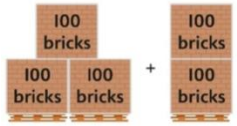
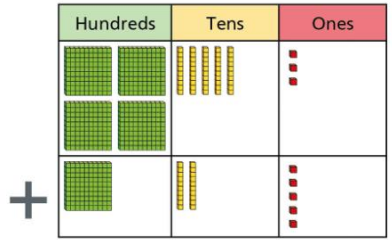
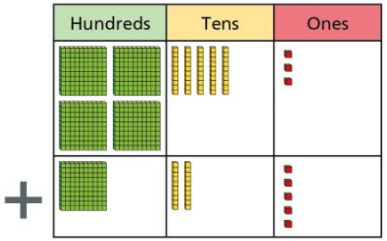
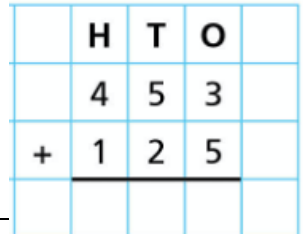
To add 2-digit number and ones (with crossing the tens boundary - exchanging)	 17 + 5 = 22 (Use ten frame to make ten) Explore patterns such as 17 + 5 = 22, 27 + 5 = 32 37 + 5 = 42	Use part part whole and number line method to model. 	Explore related facts. 17 + 5 =22 5 + 17 = 22 22-17 =5 22- 5 = 17 
To add two-digit numbers (without crossing the tens boundary)	 Model using diennes, numicon and place value counters	 Use of number line and encourage bridging of ten using part whole model.	
To add two-digit numbers (crossing the tens boundary – exchanging)	 Introducing children to the sneaky ten. Lots of opportunities of this practical.	Children can use pictorial representation using diennes or solve using the number line method. (Column method will be introduced in Year 3) 	Show calculations in different models to develop understanding of part, part whole and bar modelling 

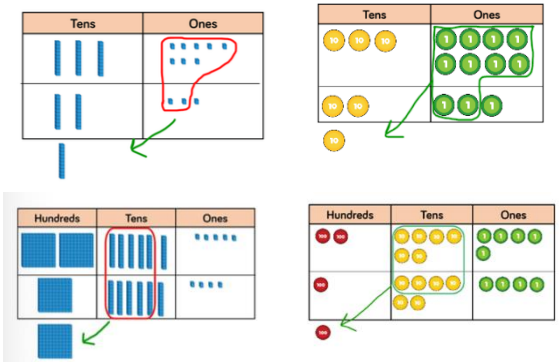
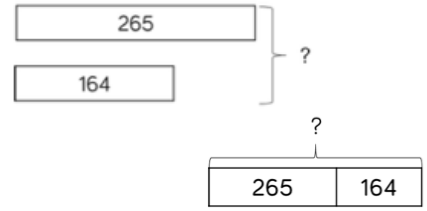
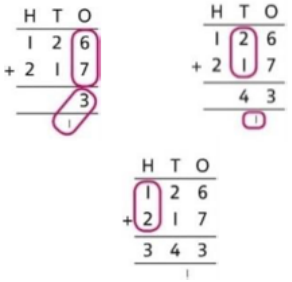
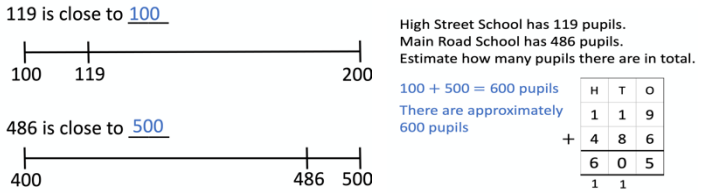
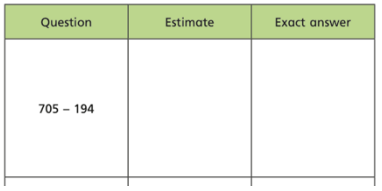
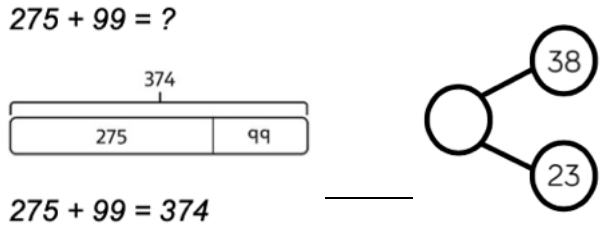
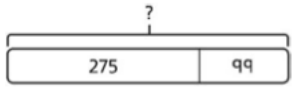
Adding three 1 digit numbers (Numicon, ten frames)	 Encourage children to look for number bonds to 10 or doubles to add numbers more efficiently.	 7 + 6 + 3 = 16 10 Continue to look for efficient strategies rather than counting all the dots.	 10 Combine the two numbers that make/ bridge then and the add on the third. 
To solve problems with addition including those with quantities and measures by using objects and pictures	Use base ten  	Draw tens and ones  	Part whole models and partitioning 41 + 8  1 + 8 = 9 40 + 9 = 49  30 + 20 = 50 5 + 5 = 10 50 + 10 + 1 = 61
Regroup to make 10 (Crossing ten) Adding across ten (Ten frames)	Start with the biggest number and use the smaller number to make 10. (Use ten frames e.g., 6 + 5) 	Use of pictures or a number line. Regroup or partition the smaller number to make 10.  3 + 9 =	Children to develop an understanding of equality (relationship between two quantities) e.g. 6 + ___ = 11 6 + 4 = 10 + 1 = 11

	Use of straws to make a bundle of 10 e.g., 8 + 7 8 + __ = 10 10 + __ = 15 How many more straws do I need to make 10? How many more do I have Left to add on? 		If I am at seven, how many more do I need to make 10? How many more do I add on now? 7 + ___ = 11 7 + 3 = 10 10 + ___ = 11

Addition calculations must also be represented with missing numbers so children can make links to inverse operations, as well as seeing the questions represented in different ways in line with your curriculum.

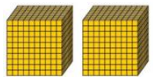
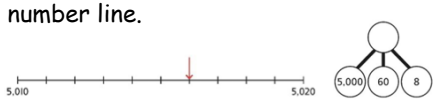
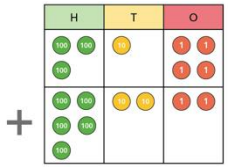
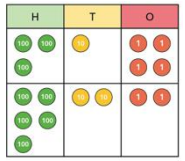
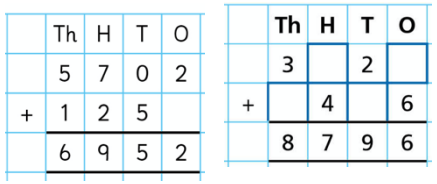
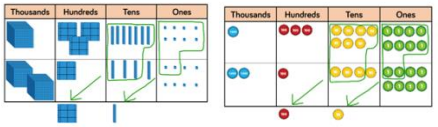
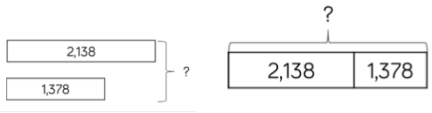
Regular practise on key number facts is essential to ensure automaticity is continued to be built upon.

Key vocabulary to be taught and rehearsed	**Add, addition, plus, altogether, more, sum, total, increase number facts/bonds, near double, double number line, count on, partition, commutative inverse, missing number, hundreds, tens, ones, column addition bar modelling, tens and hundred boundary. How many more to make? How many more is ___ than ___?**		
Year 3 Objectives	**Concrete**	**Pictorial**	**Abstract**
Add 2-digit numbers together within 100 (Recapping of regrouping will need to be taught)	 Model using diennes, numicon and place value counters	 Use of number line and encourage bridging of ten using part whole model.	 20 + 40 = 60 5+ 7 =12 60 + 12 = 72
To add multiples of 100 (using known facts)	Use known facts to add multiples of 100  3 + 2 = 5 3 hundreds + 2 hundreds = 5 hundreds 300 + 200 = 500	 **300 + 200 = 500**	**345 – 200 =** **454 = 254 + ___**
Add numbers with up to 3 digits using formal written method. (No exchanging)		Children can draw tens and ones using a place value chart. 	

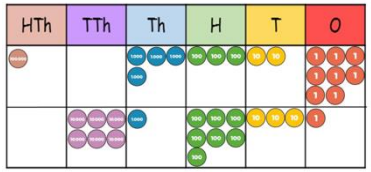
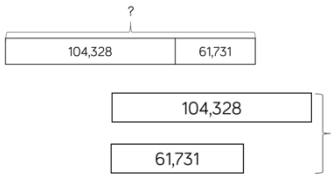
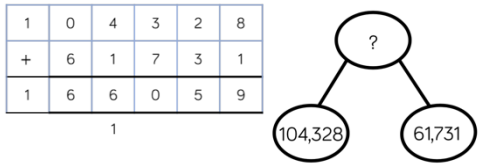
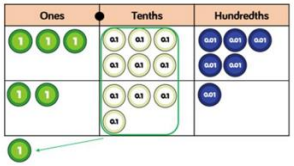
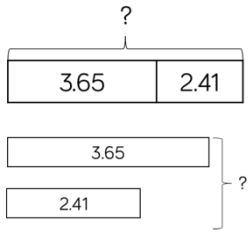
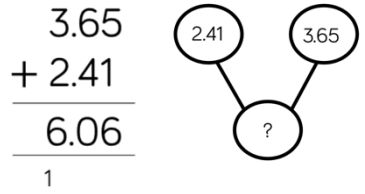
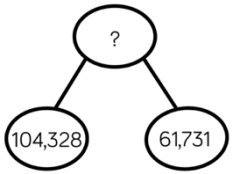
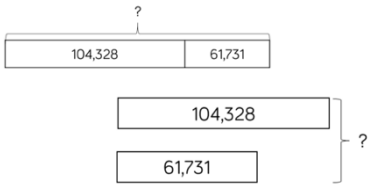
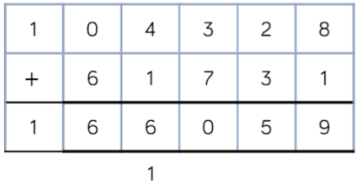
	Children must be taught to always start with the ones. Use of base ten and lots of practical opportunities		
Column Addition with exchanging upto 3-digit numbers	 Children need lots of practical exposure to see understanding ten ones = 1 ten and 10 tens = 1 hundred etc.	Children can draw pictorial representations of the column and place value counters to support understanding When children are solving problems encourage them draw a bar model to represent what it is asking them to 	Use of column addition, ensuring understand of place value at every stay of the calculation 126 + 217 - 343 
Estimate the answers to questions and use inverse operations to check answers.	Use of number lines, number squares to support children's understanding of estimating answers.  		
Representing addition problems and selecting appropriate methods.	Bar modelling, part, part whole to helps children select apporiate methods. 		Use representations to support choices of appropriate methods. 

In Autumn 1 regular practise on key number facts is essential to ensure automaticity is continued to be built upon so children can make links to inverse operations, as well as seeing the questions represented in different ways in line with your curriculum.

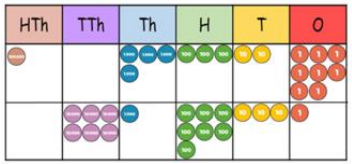
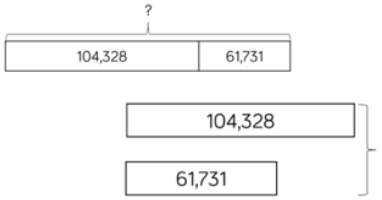
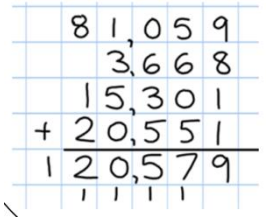
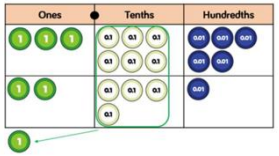
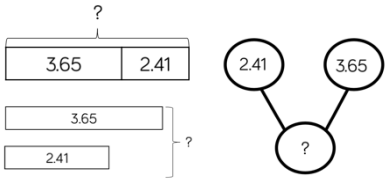
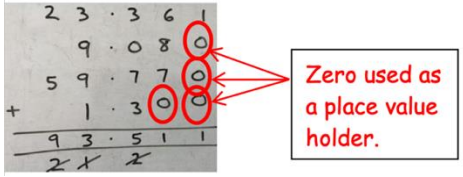
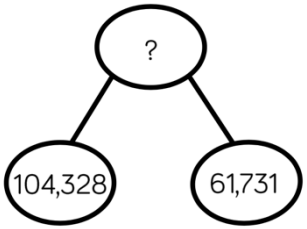
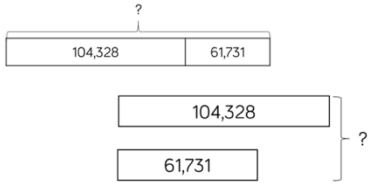
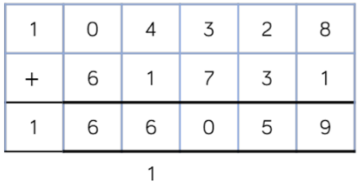
		I will add 100, then subtract 1 to find the solution.

Key vocabulary to be taught and rehearsed	**Add, addition, plus, altogether, more, sum, total, increase, number facts/bonds, near double, double number line, count on, partition, commutative, inverse, missing number Hundreds, tens, ones, column addition bar modelling, tens, hundreds, thousands boundary. How many more to make? How many more is ___ than ___? How much more is…?**		
Year 4 Objectives	**Concrete**	**Pictorial**	**Abstract**
Understanding numbers to 10,000	Base ten to understand the value of 4-digit numbers 2 thousand equals 2,000 1 thousand is 10 hundreds. 	Represent numbers using PV counters once children understand relationship between 1,000s and 100s  *2,000 + 500 + 40 + 2 = 2,542*	Understand partitioning of 4-digit numbers. To read 4-digit numbers on a number line. 
To add numbers up to 4 digits (without regrouping/exchanging	Use of base 10 and counters to develop understanding. 	Continue to use pictorial representations to deepen understanding. 	
To add numbers up to 4 digits (with regrouping/exchanging	 Lots of practical opportunities and discussion so children understanding each stage of the calculation.	 Supporting children to draw models to help understand the calculation.	Use of column addition, ensuring understand of place value at every stay of the calculation 

Addition calculations must also be represented with missing numbers so children can make continuous links to inverse operations as well as seeing the questions represented in different ways in line with your curriculum.

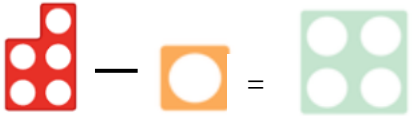
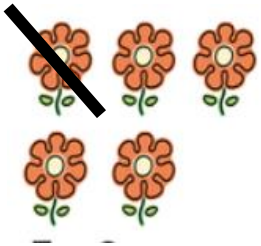
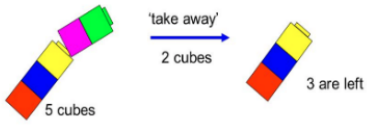
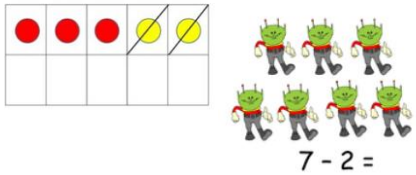
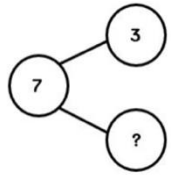
Key vocabulary to be taught and rehearsed	**Add, addition, plus, altogether, more, sum, total, increase, number facts/bonds, near double, double number line, count on, partition, inverse, missing number, hundreds, tens, ones, column addition, bar modelling, tens, hundreds, thousands, ten thousands, millions, tenths boundary decimal, decimal point, How much more is…? How many more to make? How many more is ___ than ___? commutative**		
Year 5 Objectives	**Concrete**	**Pictorial**	**Abstract**
To add whole numbers with more than 4 digits using formal written method.			
Add with up to 3 decimal places.	 Use of place value counters		
Solve addition multi step problems in contexts	Bar modelling, part, part whole to helps children select apporiate methods. 		

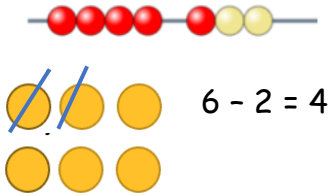
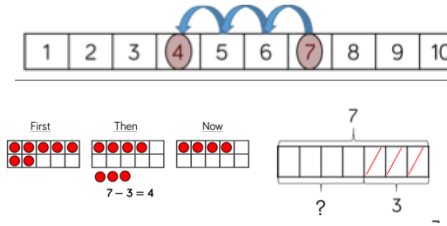
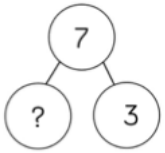
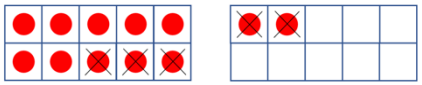
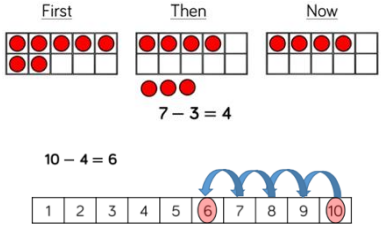
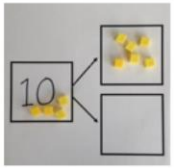
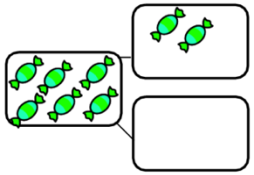
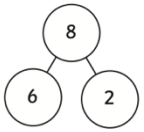
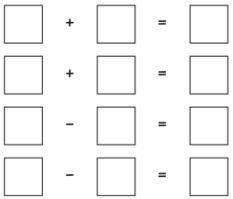
Addition calculations must also be represented with missing numbers so children can make links to inverse operations, as well as seeing the questions represented in different ways in line with your curriculum.

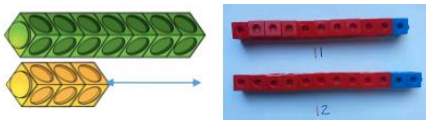
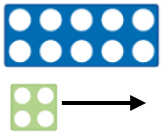
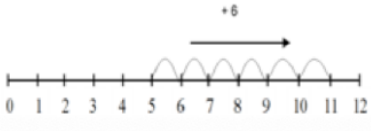
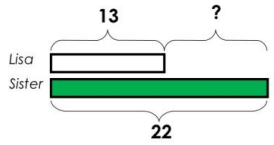
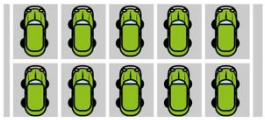
Key vocabulary to be taught and rehearsed	Add, addition, plus, altogether, more, sum, total, increase, number facts/bonds, near double, double number line, count on, partition, inverse, commutative, missing number, hundreds, tens, ones, column addition, bar modelling, tens, hundreds, thousands, ten thousands, millions, tenths boundary decimal, decimal point, How much more is…? How many more to make? How many more is ___ than ___?		
Year 6 Objectives	**Concrete**	**Pictorial**	**Abstract**
To add several numbers with more than 4 digits using formal written method.			
Adding several numbers with different numbers of decimal places (including money and measures):	Use of place value counters and place value mats 	Pictorial representations 	
Solve multi-steps addition problems	Bar modelling, part, part whole to helps children select apporiate methods.  		

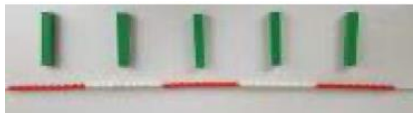
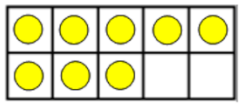
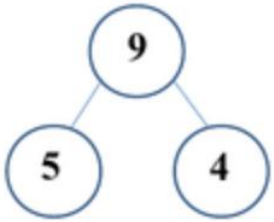
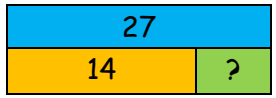
Addition calculations must also be represented with missing numbers so children can make links to inverse operations, as well as seeing the questions represented in different ways in line with your curriculum.

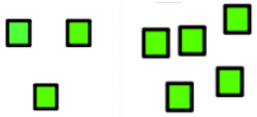
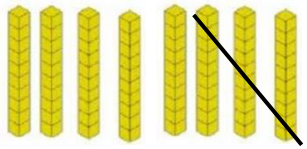
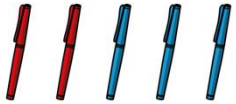
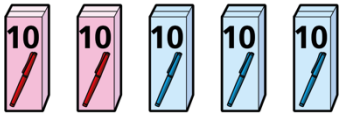
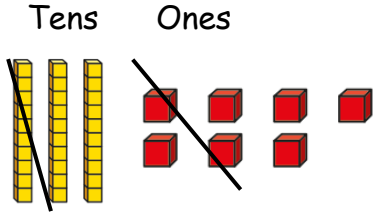
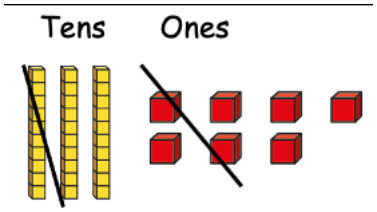
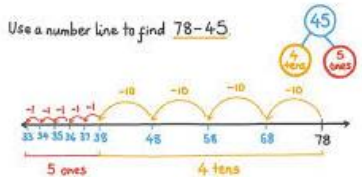
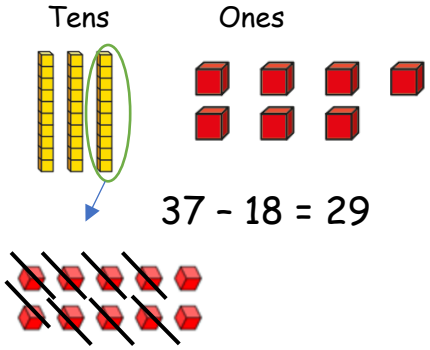
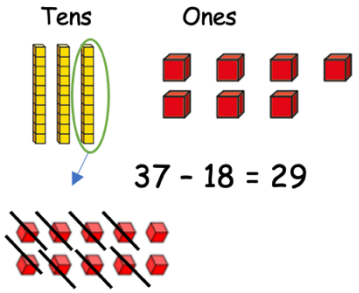
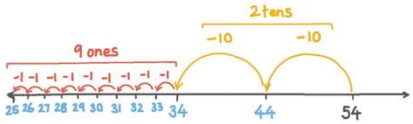
Section 3: Subtraction at Aldermans Green

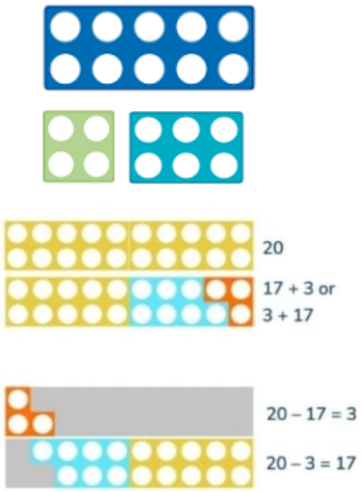
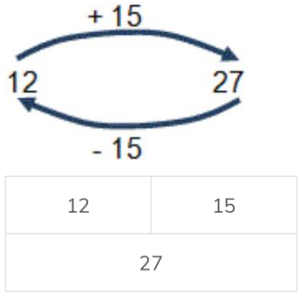
Key Vocabulary to be taught and rehearsed	**How many more to make ..? How many more is..than.? Take away How many are left over? How many have gone? One less, two less.... How much less/fewer is ...?**		
EYFS Subtraction Objectives	**Concrete**	**Pictorial**	**Abstract**
Find one less from a group of five objects, then ten objects.			One less than 5 is 4
Automatically recall number bonds (subtraction) up to 5 some up 10.			7 - 3 = ? 

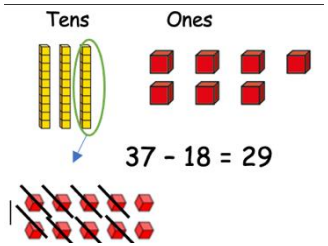
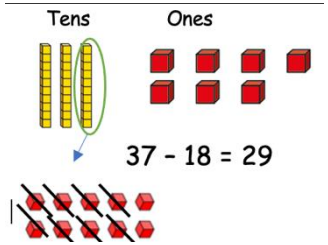
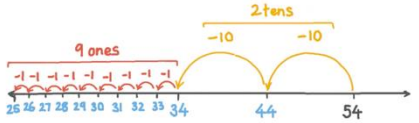
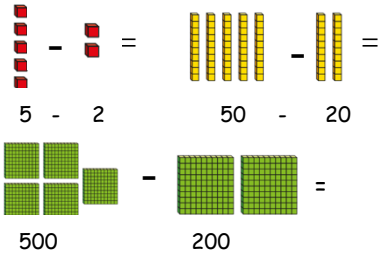
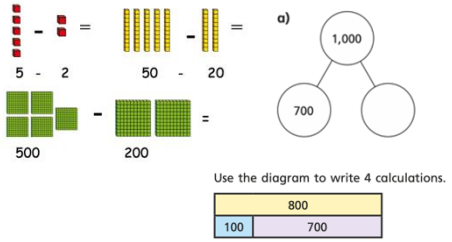
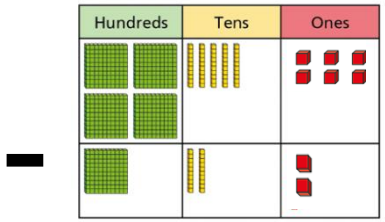
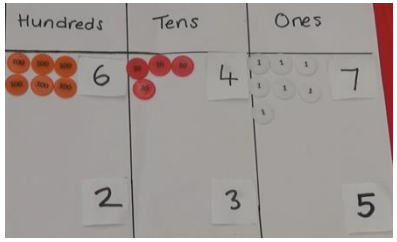
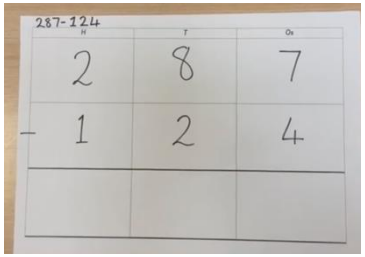
Key Vocabulary to be taught and rehearsed	equal to, take, take-away, less, minus, subtract, leaves, difference between, how many more, how many fewer/less than, most, least count back, how many left, how much less is... One less, two less.... How many more is..than.?		
Year 1 Objectives	**Concrete**	**Pictorial**	**Abstract**
Subtract 1-digit numbers (ones) within 10	 6 – 2 = 4		7 -3 = ? 
Subtract one-digit and two-digit numbers to 20 including 0 (Bead strings, Numicon, Ten frames)	10 -2  12 - 5 = 		15 – 4 = 11 10 – 6 = 4
Represent and use number bonds and related subtraction facts within 20.	 Link to addition Use part, part whole model to inverse. If 10 is the whole and 6 is one of the part what would the other part be?	 Use of pictorial representations of objects to show part-part whoe model.	 I know 6 -4 = 2 What else do you know? 

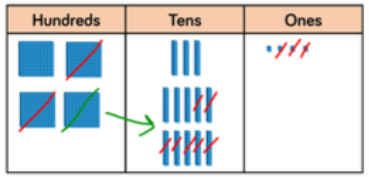
Find the difference (Cubes, Bar modelling, Numicon)	 Use cubes to build towers to make bars to find the difference 	Count on to find the difference.   	Hannah has 23 sandwiches; Helen has 15 sandwiches. Find the difference between the number of sandwiches.
Solve one step problems that involve subtraction using concrete and pictorial representations.	Use of toys cars or other concrete resources e.g., dinosaurs, counters, cubes, 	There are 10 cars in a car park.  4 cars leave. How many cars are left in the car park?	Ann and Tom have 15 strawberries in total. Ann eats 6 strawberries How many strawberries do they have left?

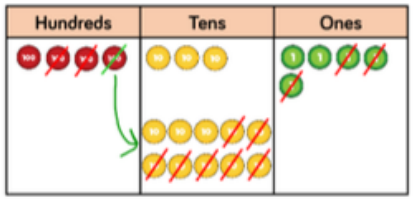
Key Vocabulary to be taught and rehearsed	**equal to, take, take-away, less, minus, subtract, leaves, difference between distance between, how many more, how many fewer/less than, most, least count back, how many left, how much less is...**		
Year 2 Objectives	**Concrete**	**Pictorial**	**Abstract**
To subtract multiples of 10 (Diennes, Beads strings or Numicon)	50 – 30 = 50 or 30 = 50 - 20 	 8 tens – 3 tens 80 – 30 = 50 (Diennes, Numicon, Ten Frames, Bundles of straws in 10s)	70 - 30 = 50 = 70 - 20 40 - ___ = 20 60 = 90 - ___
To use known subtraction number facts. (Part, part whole, ten frames and numicon)	9 – 5 or 9 – 4 Use ten frames to allow children to create this calculations and begin to see links 	9 – 5 = 4 9 – 4 = 5 19 – 5 = 4 19 – 4 = 5 	What subtraction facts do you know which can help use with this subtraction? 27 – 14 = ? (7 – 4 = 3) 

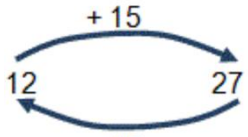
Recall subtraction facts to 20 fluently and derive and use related facts up to 100 (Diennes)	8 - 3 = 5  80 - 30 = 50 	Eva has 2 red pens and 3 blue pens.  How many pens does Eva have? Tommy has 20 red pens and 30 blue pens.  How many pens does Tommy have?	5 – 3 = 2 50 – 30 = ☐ 7 – 1 = 6 70 – 10 = ☐
To subtract two-digit numbers (without crossing the tens boundary)	 37 – 14 = 23	 37 – 14 = 23	 More confident children can jump in multiples of 10.
To subtract 2-digit number and ones (with crossing the tens boundary - exchanging)	 37 – 18 = 29 Lots of practical exposure.	 37 – 18 = 29	Subtracting through counting back on a number line crossing tens boundary 54 - 29 = 25 

Use the inverse relationships between addition and subtraction to check calculations (Numicon, cubes, bar modelling)		 6 + 4 = 10 4 + 6 = 10 10 – 4 = 6 10 – 6 = 4  14 + 6 = 20 6 + 14 = 20 20 – 16 = 4 20 – 4 = 16	Inversion Loops  How could you use your knowledge of the inverse relationship to help you check if this calculation is correct?

Key Vocabulary to be taught and rehearsed	**equal to, take, take-away, less, minus, subtract, leaves, difference between distance between, how many more, how many fewer/less than, most, least count back, how many left, how much less is...**		
Year 3 Objectives	**Concrete**	**Pictorial**	**Abstract**
Subtract 2-digit numbers together within 100 (Recapping of regrouping will need to be taught)			Subtracting through counting back on a number line crossing tens boundary 54 - 29 = 25 
To subtract multiples of 100 (using known facts)			600 – 400 600 – 300 600 – 200 600 – 100 600 – 0 The answer is 700. How many questions can you think of that subtract hundred to make 700? How do you know you have found them all?
Subtract numbers up to 3 digits using formal written method. (No exchanging)	 454 - 122 =		

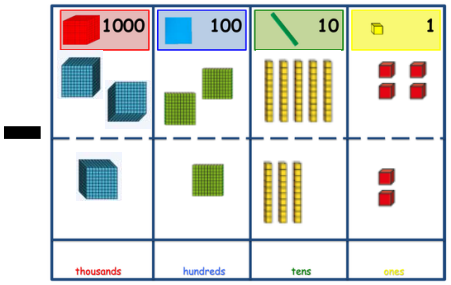
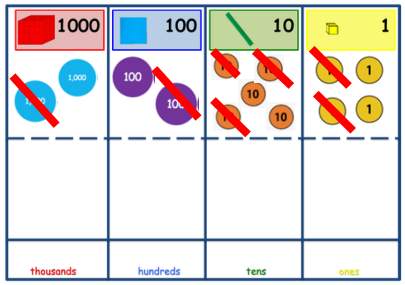
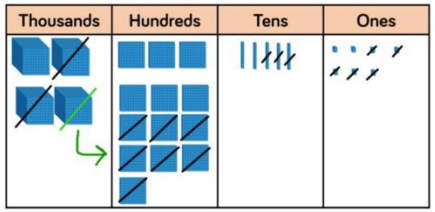
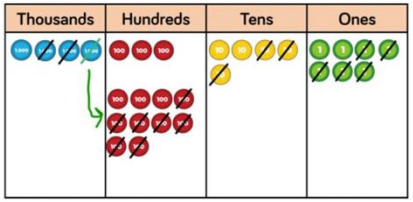
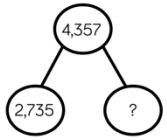
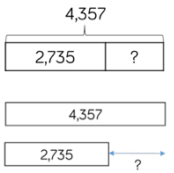
<table>
<tr>
<td>Column subtraction with exchanging up to 3-digit numbers</td>
<td> 

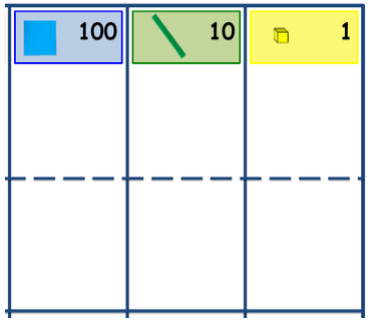
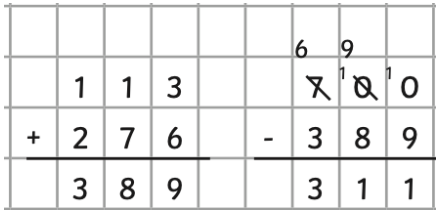
Exploring and practise through diennes.</td>
<td> 
</td>
<td>435 – 273 = 262
3 1
435
– 273
262</td>
</tr>
<tr>
<td>To check answers using the inverse operation.</td>
<td> 

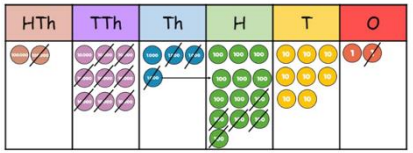
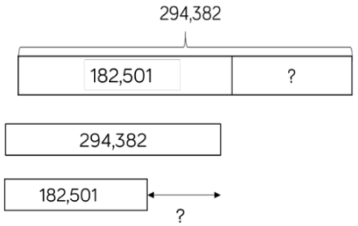
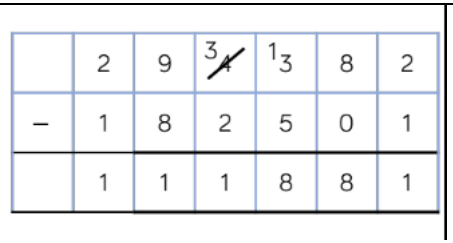
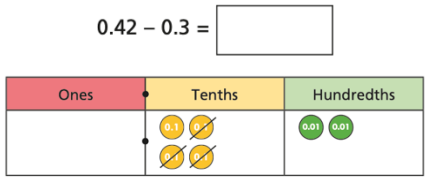
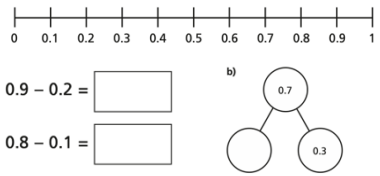
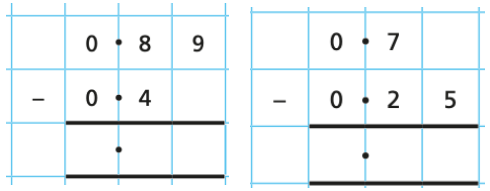
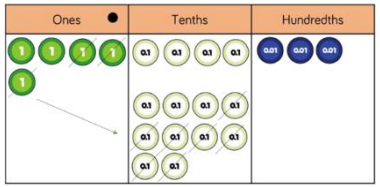
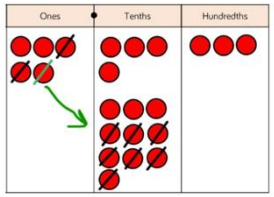
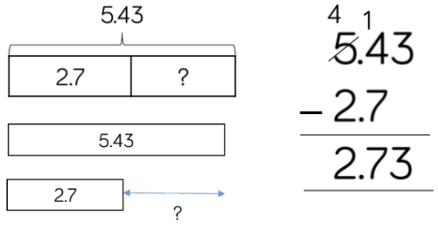
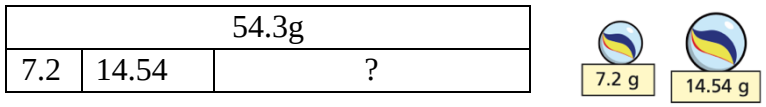
For children struggling to grasp this concept use numicon with smaller number calculations to help with understanding e.g. number facts within 20.</td>
<td>The bar model
12 | 15
27
27
15 | ?</td>
<td>Inversion Loops
 

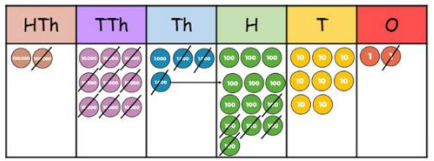
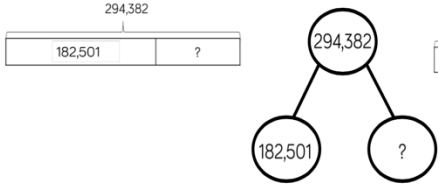
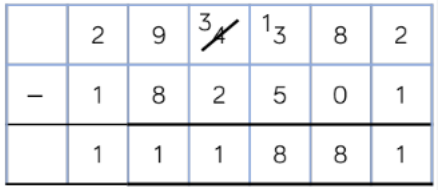
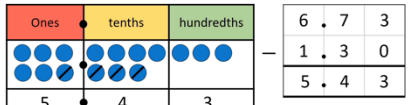
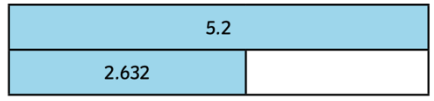
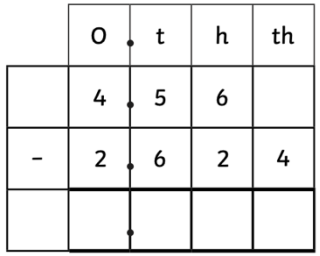
How could you use your knowledge of the inverse relationship to help you check if this calculation is correct?</td>
</tr>
</table>

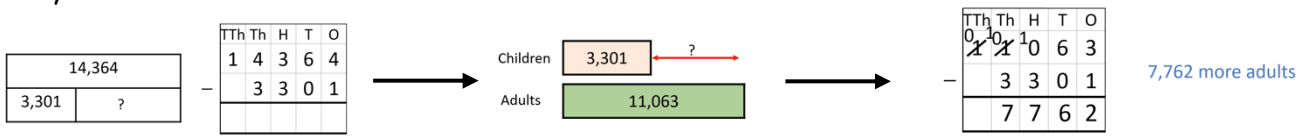
In Autumn 1 regular practise on key subtraction number facts is essential to ensure automaticity is continued to be built upon so children can make links to inverse operations, as well as seeing the questions represented in different ways in line with your curriculum.

Key Vocabulary to be taught and rehearsed	**equal to, take, take-away, less, minus, subtract, leaves, difference between distance between, how many more, how many fewer/less than, most, least count back, how many left, how much less is...**		
Year 4 Objectives	**Concrete**	**Pictorial**	**Abstract**
To subtract numbers up to 4 digits (without regrouping/exchanging	 2254 – 1132 =	 2254 – 1132 =	6 2 7 6 – 3 1 5 3 Also expose children to part whole model and bar method to show calculation.
To subtract numbers up to 4 digits (with regrouping/exchanging	 Ensure children write out the calculation alongside any resources so they can see the link to the written column method	 4,357 – 2,735 =	  3 1 ~~4~~357 – 2735 1622

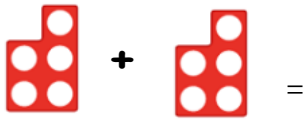
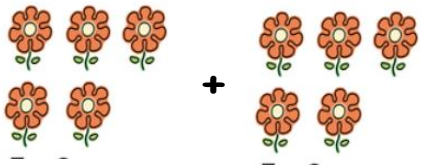
Solve subtraction and addition two step problems in contexts.	The cinema has 700 seats – 113 adults and 276 chlidren come to see the film. How many empty seats are there?  Highlight they key infromation	Do step 1 of the calcualtion first usinhg a written method if needed. 700 – (113 + 276) 700 113 | 276 | ? Afte focus on step 2 of the calculation. 700 – 389 = 700 389 | ?	

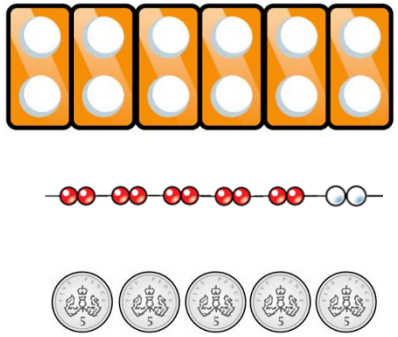
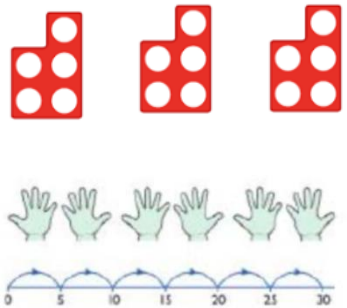
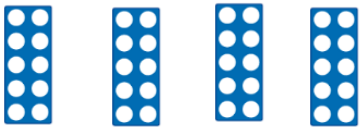
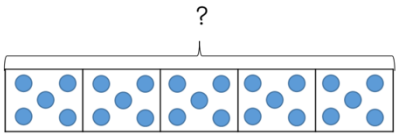
Key Vocabulary to be taught and rehearsed	**equal to, take, take-away, less, minus, subtract, leaves, difference between, distance between, how many more, how many fewer/less than, most, least count back, how many left, how much less is...**		
Year 5 Objectives	**Concrete**	**Pictorial**	**Abstract**
To subtract whole numbers with more than 4 digits using formal written method.			
Subtract decimals within 1			
Subtract decimals with a number of different decimals places.	 5.43 – 2.7 =		
Solve subtraction multi step problems in contexts	The mass of a bag of marbles is 54.3g. These two marbles are removed from the bag. What is the mass of the bag of marbles now? 		The mass of a bag of marbles is 54.3g. These two marbles are removed from the bag. What is the mass of the bag of marbles now?

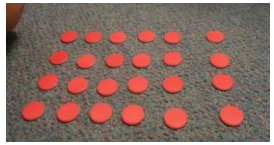
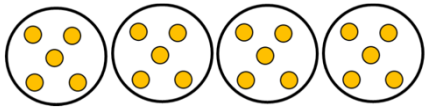
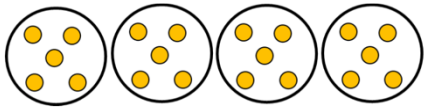
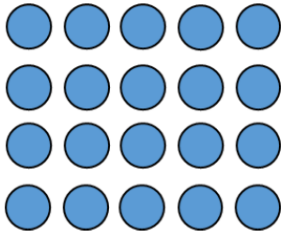
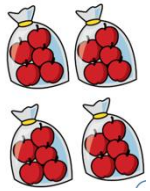
Key Vocabulary to be taught and rehearsed	**equal to, take, take-away, less, minus, subtract, leaves, difference between, distance between, how many more, how many fewer/less than, most, least count back, how many left, how much less is...**		
Year 6 Objectives	**Concrete**	**Pictorial**	**Abstract**
To subtract several numbers with more than 4 digits using formal written method.			
Subtracting several numbers with different numbers of decimal places (including money and measures):		 2.632 + _____ = 5.2	
Solve multi-steps subtraction problems	There are 14,364 people at a football. 3,301 of the crowd are children How many more adults than children are there?		

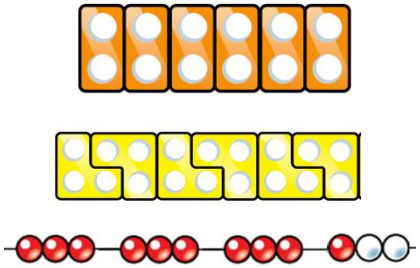
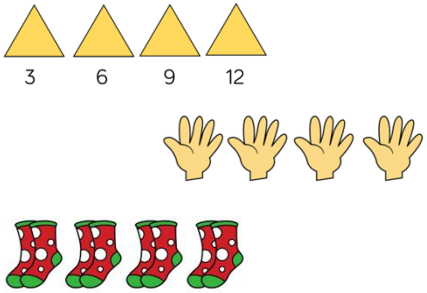
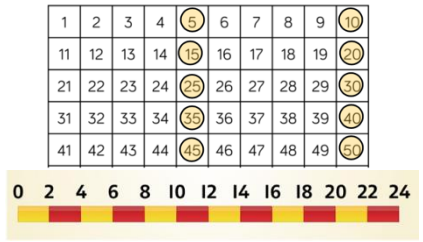
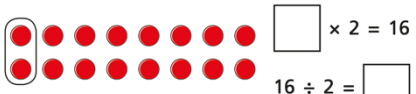
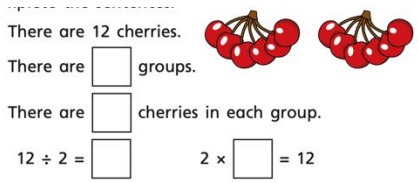
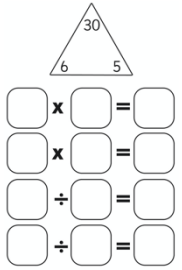


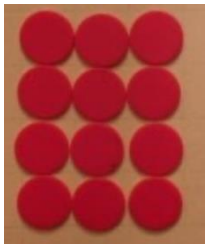
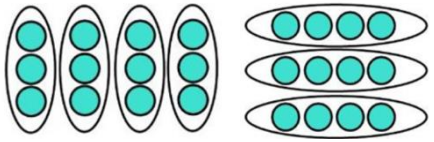
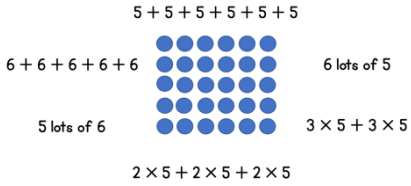
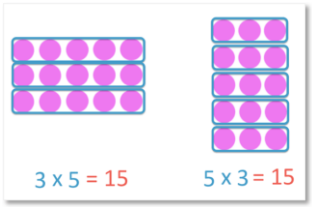
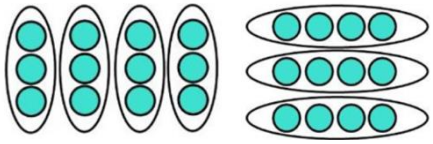
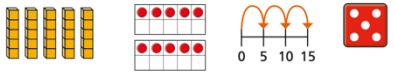
Section 6: Multiplication at Alderman's Green

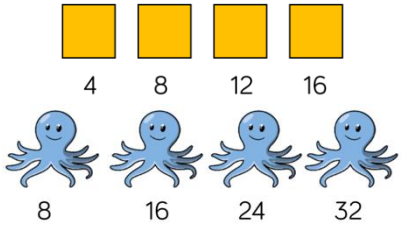
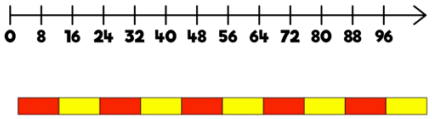
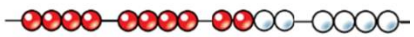
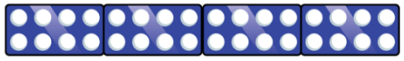
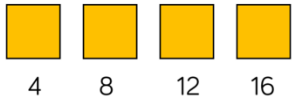
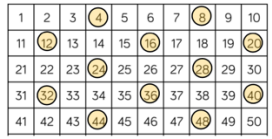
Key Vocabulary to be taught and rehearsed	**Doubles, doubling, adding the same out. number patterns**		
EYFS multiplication objectives	**Concrete**	**Pictorial**	**Abstract**
Explore and represent patterns within numbers up to 10, including doubles	 	 	1 + 1 = 2 + 2 = 3. + 3 = 4 + 4 = 5 + 5 =

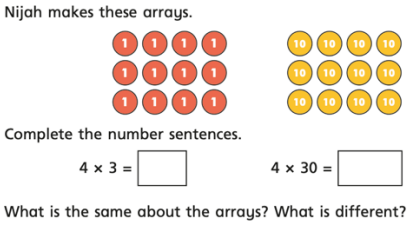
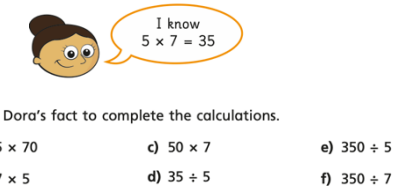
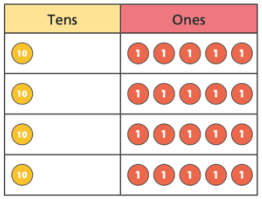
Key Vocabulary to be taught and rehearsed	Groups of, equal groups, lots of, times, array, altogether, multiply, repeated addition,		
Year 1 Multiplication Objectives	**Concrete**	**Pictorial**	**Abstract**
To count in multiples of 2, 5 and 10 (Numicon, bead strings, cubes, dice)			 **5, 10, 15, 20, 25, 30** Counting stick to support counting forwards and backwards in multiples of 2, 5 and 10.
To be able to count in repeated addition. (Numicon, bar modelling, bead strings, ten frames)	 **10. + 10 + 10. + 10**	 **5 + 5 + 5 + 5 + 5 =**	There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there?  **2 + 2 + 2 = 6**

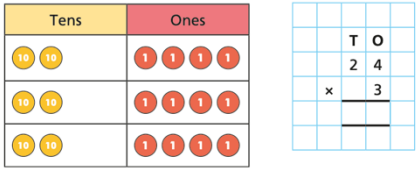
To understand and read arrays	  Practical opportunities to create arrays to show multiplication sentences.	What repeated addition number sentences can you see here? 	Use this array to write any multiplication and repeated addition number sentences you might know. 
Solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	One bag holds 5 apples. How many apples do 4 bags hold?  	5 + 5 + 5 + 5 = 20  	One bag holds 5 apples. How many apples do 4 bags hold? 

Key Vocabulary to be taught and rehearsed	**Groups of, lots of, times, array, altogether, multiply, multiplied by, repeated addition, sets of, equal groups, times as big as, commutative. product,**		
Year 2 Multiplication Objectives	**Concrete**	**Pictorial**	**Abstract**
Count in steps of 2, 3 and 5 from 0 in tens from any number forward and backward (Numicon, bead stings, cubes, 100 square, counting stick)			 Counting stick with post it notes to support counting forwards and backwards in multiples of 2, 5 and 10.
Recall and use multiplication facts for 2, 5 and 10-times tables.	 Use of counters, numicon to create arrays to explore relationships.		 I go to the bakery to buy 10 crumpets. I can fit 5 in each bag, so I need 2 bags. True or False? Explain your answer

Using array for multiplication	  5 x 4 4 x 3		**True or False** All of the number sentences can be used to find the total of the array 
Show that multiplication of two numbers can be done in any order (commutative)	 	Use representations of arrays to show different calculations and explore commutativity 	 What multiplication and repeated addition sentences can we get from this array?
Solve problems involving multiplication using materials, arrays, repeated addition, including problems in contexts	Match the picture to the times table fact.  3 × 5 2 × 5 1 × 5 5 × 5 How much money does Ron have?  Complete the multiplication. ☐ × ☐ = ☐	What is the same about the number sentences? What is different? a)  b)  A sandwich costs £2 and a box of crayons costs £5  Jack buys 5 sandwiches and 3 boxes of crayons. How much does he spend in total? Use of bar modelling or pictures to support.	Ben has five marbles. Kemi has seven times that number. How many marbles does Kemi have?  The answer is 12 What could the multiplication be?

Key Vocabulary to be taught and rehearsed	**Groups of, lots of, times, array, altogether, multiply, multiplied by, repeated addition, sets of, equal groups, times as big as, commutative, product, multiples of, scale up**		
Year 3 Multiplication Objectives	**Concrete**	**Pictorial**	**Abstract**
Count in steps of 4, 8, 50, and 100 from 0 in tens from any number forward and backward	 8, 16, 24 etc.. Encourage daily counting in multiples	 4 8 12 16 8 16 24 32	 Counting stick with post it notes to support counting forwards and backwards in multiples of 4, 8, 50 and 100.
recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables	 4 lots of 4 = 4 x 4 = 16  4 lots of 8 = 4 x 8 = 24	 4 8 12 16 8 16 24 32  Whitney has 10 packs of seeds? How many seeds does Whitney have in total?	 4 and 8 times tables look for patterns making links e.g. 4 times tables seeing how much each multiple is double the fours etc. Counting stick with post it notes to support recall of times tables 3, 4 and 8.

<table>
<tr>
<td>To write and calculate mathematical statements for multiplication and division using the multiplication tables that they know,</td>
<td> 
</td>
<td> 
</td>
<td> 
</td>
</tr>
<tr>
<td>To multiply two-digit numbers times one-digit numbers, using mental and progressing to formal written methods</td>
<td>4 x 15 =
 

Use of place value counters or dines to support understanding.</td>
<td>24 x 3
 
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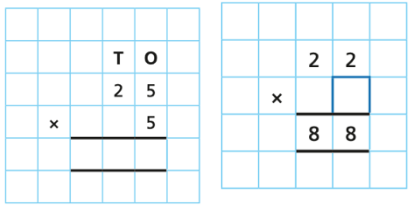
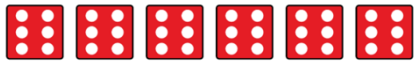
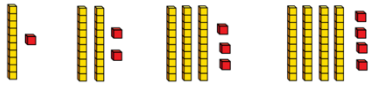
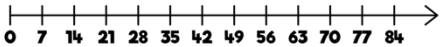
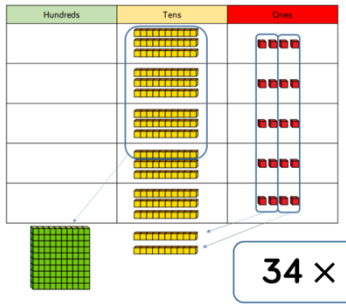
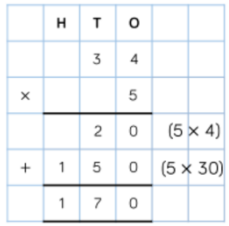
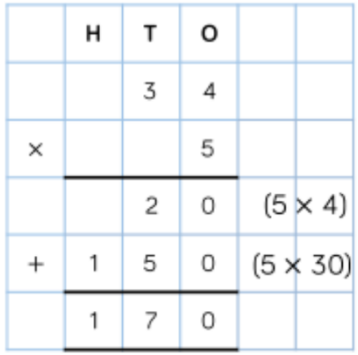
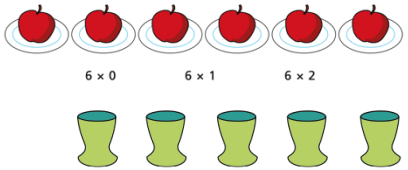
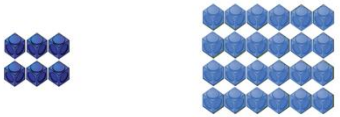
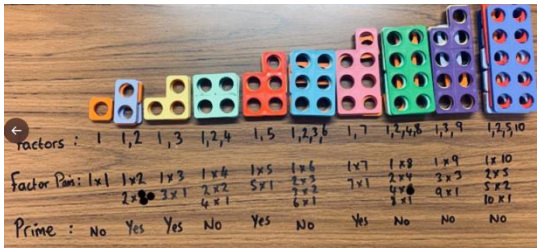
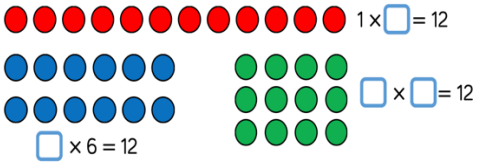
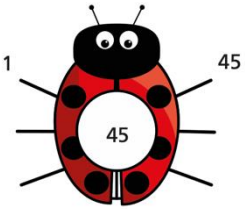
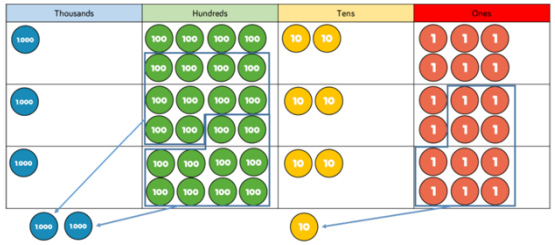
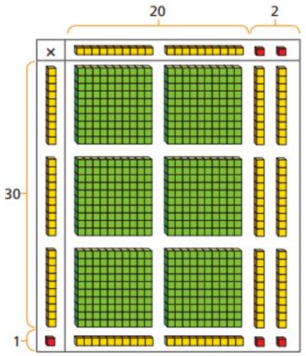
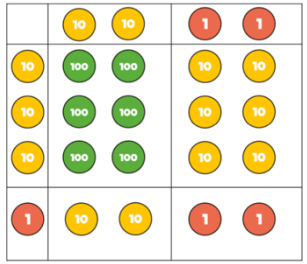
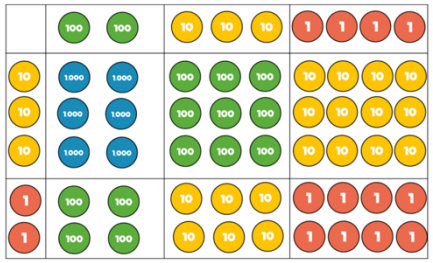
<td> 
</td>
</tr>
</table>

Key Vocabulary to be taught and rehearsed	**Groups of, lots of, times, array, altogether, multiply, multiplied by, repeated addition, sets of, equal groups, times as big as, commutative, product, multiples of, scale up, inverse, derive**		
Year 4 Multiplication Objectives	**Concrete**	**Pictorial**	**Abstract**
Recall multiplication facts for tables up to 12 x 12	 6 x 6  3 x 7  4 x 11	 3 x 12  3 x 6  3 x 9	 Counting stick with post it notes to support recall of times tables up to 12 x 12.  0 7 14 21 28 35 42 49 56 63 70 77 84
Multiply two digit and three-digit numbers by a one-digit number using formal written layout	  H T O 3 4 × 5 2 0 (5 × 4) + 1 5 0 (5 × 30) 1 7 0 34 × 5 = 170 Children to explore the expanded column method before moving onto short multiplication method.		 H T O 3 4 × 5 2 0 (5 × 4) + 1 5 0 (5 × 30) 1 7 0

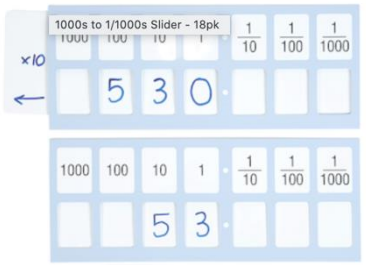
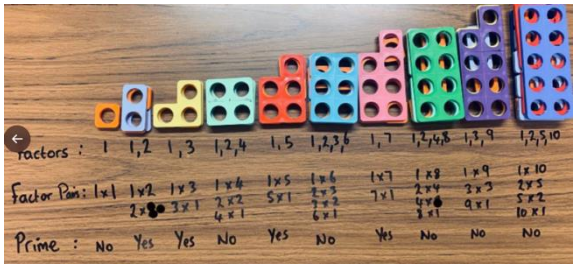
<table>
<tr>
<td>Multiplying by 0 and 1</td>
<td>Which calculation works out the number of apples?
  X 0 =
  X 1 =
 
6 × 0 6 × 1 6 × 2
a) How many flowers are in each vase?
b) How many flowers are there in total?</td>
<td>What could the missing number be?
0 × ☐ = 0
Which calculations have an answer of zero?
39 × 1 95 × 0
4 × 1 0 × 16
8 × 0 0 × 0</td>
</tr>
<tr>
<td>Multiplying together three numbers</td>
<td>What multiplications are shown by these arrays?
 
 
There are 4 groups of 6
There are 4 groups of 3 × 2
3 × 2 × 4 = 6 × 4
3 × 2 = 6 6 × 4 = 24
  </td>
<td>2 × 5 × 3
10 × 3
30
or
3 × 2 × 5
6 × 5
30
Applying the skills to compare number sentences.
4 × 5 × 2 > 4 × 9
4 × 10</td>
</tr>
<tr>
<td>Recognise and use factor pairs.</td>
<td> 
Complete the factor pairs for 12
 
1 × ☐ = 12
☐ × ☐ = 12
☐ × 6 = 12
Factor sandwiches with numicon- Write the factors and the pairs.
If it has one pair, then it is a prime number.</td>
<td> 
1 45 45</td>
</tr>
</table>

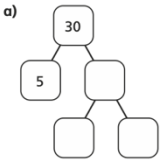
<table>
<tr><td>Key Vocabulary to be taught and rehearsed</td><td colspan="3">Groups of, lots of, times, array, altogether, multiply, multiplied by, repeated addition, sets of, equal groups, times as big as, commutative, product, multiples of, scale up, inverse, derive, factor pairs, composite numbers, prime number, factors, squared, cubed</td></tr>
<tr><td>Year 5 Multiplication Objectives</td><td>Concrete</td><td>Pictorial</td><td>Abstract</td></tr>
<tr><td>Multiply numbers up to 4 digits by 1 or 2 digits using a formal written method.</td><td colspan="2">When multiplying 4 digit numbers place value counters are the best manipulative to support understanding of the formal written method.
1,826 × 3 = 5,478
 
</td><td>If children are multiplying larger numbers and struggling with times tables provide multiplication grids to allow focus on the method.
<table><tr><td></td><td>Th</td><td>H</td><td>T</td><td>O</td></tr><tr><td></td><td>1</td><td>8</td><td>2</td><td>6</td></tr><tr><td>×</td><td></td><td></td><td></td><td>3</td></tr><tr><td></td><td>5</td><td>4</td><td>7</td><td>8</td></tr><tr><td></td><td>2</td><td></td><td>1</td><td></td></tr></table></td></tr>
<tr><td>Multiply 2-digit numbers by 2-digit numbers.</td><td colspan="2">When multiplying a multi-digit number by 2 digits, use the area model to help children understand the size of the numbers they are using.
 


<table><tr><td>×</td><td>20</td><td>2</td></tr><tr><td>30</td><td>600</td><td>60</td></tr><tr><td>1</td><td>20</td><td>2</td></tr></table></td><td><table><tr><td></td><td>H</td><td>T</td><td>O</td></tr><tr><td></td><td></td><td>2</td><td>2</td></tr><tr><td>×</td><td></td><td>3</td><td>1</td></tr><tr><td></td><td></td><td>2</td><td>2</td></tr><tr><td></td><td>6</td><td>6</td><td>0</td></tr><tr><td></td><td>6</td><td>8</td><td>2</td></tr></table></td></tr>
</table>

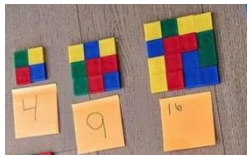
<table>
<tr>
<td>Multiplying 3-digit numbers by 2 digit numbers.</td>
<td>Children can continue to use the are model when multiplying 3-digits by 2 digits. Place value counters are more efficient but for less able leaners Base 10 can be used to highlight the size of numbers.
 
$234 \times 32 = 7{,}488$
<table>
<tr><td>×</td><td>200</td><td>30</td><td>4</td></tr>
<tr><td>30</td><td>6,000</td><td>900</td><td>120</td></tr>
<tr><td>2</td><td>400</td><td>60</td><td>8</td></tr>
</table>
</td>
<td>Encourage children to move towards the formals written method, seeing the links with the grid method.
<table>
<tr><td>Th</td><td>H</td><td>T</td><td>O</td></tr>
<tr><td></td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>×</td><td></td><td>3</td><td>2</td></tr>
<tr><td></td><td>4</td><td>6</td><td>8</td></tr>
<tr><td>¹7</td><td>¹0</td><td>2</td><td>0</td></tr>
<tr><td>7</td><td>4</td><td>8</td><td>8</td></tr>
</table>
</td>
</tr>
<tr>
<td>Multiply 4 digit numbers by 2 digit numbers.</td>
<td colspan="2">
<table>
<tr><td>TTh</td><td>Th</td><td>H</td><td>T</td><td>O</td></tr>
<tr><td></td><td>2</td><td>7</td><td>3</td><td>9</td></tr>
<tr><td>×</td><td></td><td></td><td>2</td><td>8</td></tr>
<tr><td>²2</td><td>⁵1</td><td>³9</td><td>⁷1</td><td>2</td></tr>
<tr><td>+</td><td>¹5</td><td>4</td><td>¹7</td><td>8</td><td>0</td></tr>
<tr><td></td><td>7</td><td>6</td><td>6</td><td>9</td><td>2</td></tr>
<tr><td></td><td></td><td>1</td><td></td><td></td><td></td></tr>
</table>
2739 x 8
2739 x 20
</td>
<td>When multiplying 4-digits by 2 digits children should be confident in the written method. If they are still struggling times tables provide multiplication grids to support when they are focusing on the use of the method.

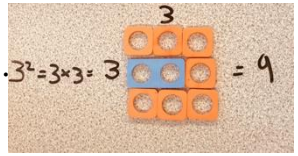
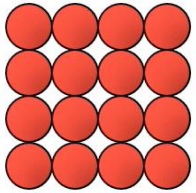
Ensure the exchanged digits and places and make sure this is consistent</td>
</tr>
</table>

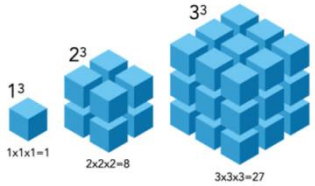
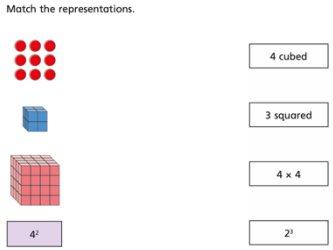
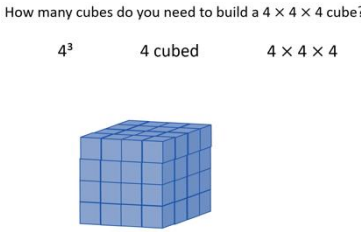
<table>
<tr>
<td>Multiply whole numbers and those involving decimals by 10, 100 and 1000</td>
<td> 
</td>
<td>
<table>
<tr><th>Th</th><th>H</th><th>T</th><th>O</th></tr>
<tr><td></td><td>2</td><td>0</td><td>5</td></tr>
</table>
205 x 10
<table>
<tr><th>H</th><th>T</th><th>O</th><th>Tths</th><th>Hths</th></tr>
<tr><td></td><td></td><td>4</td><td>0</td><td>5</td></tr>
</table>
5 x 100
</td>
<td>Complete the calculations.
a) 7.7 × ☐ = 770
b) ☐ × 10 = 1,950
c) 11.5 × ☐ = 115
d) ☐ × 11.5 = 11,500</td>
</tr>
<tr>
<td>Establish whether a number up to 100 is a prime number</td>
<td colspan="2"> 

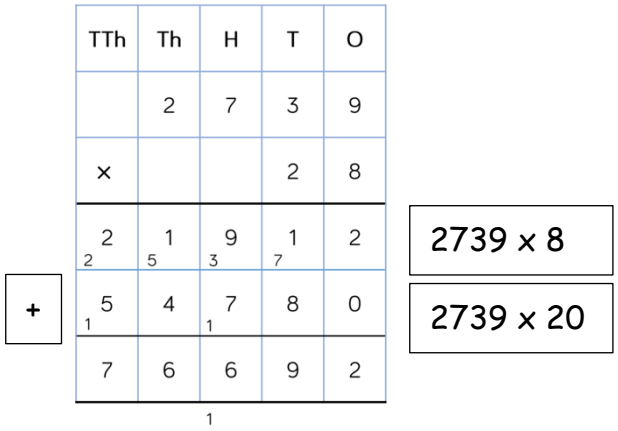
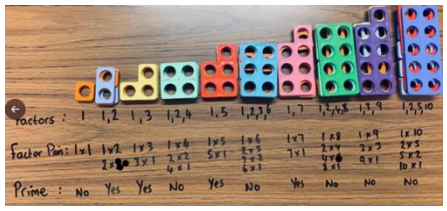
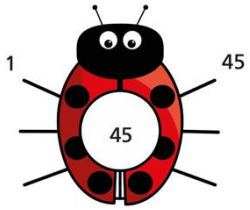
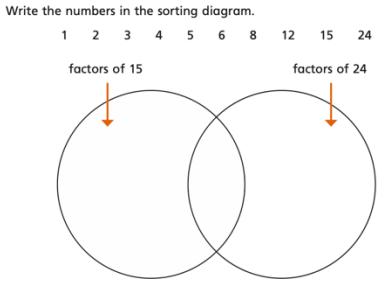
Factor sandwiches with numicon- Write the factors and the pairs. If it has one pair, then it is a prime number.</td>
<td>Complete the prime factor trees.
a)
 

c)
 

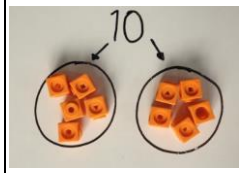
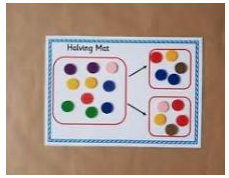
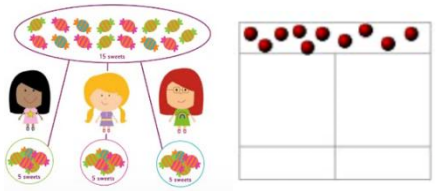
<table>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr>
<tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td></tr>
<tr><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td></tr>
<tr><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td><td>38</td><td>39</td><td>40</td></tr>
<tr><td>41</td><td>42</td><td>43</td><td>44</td><td>45</td><td>46</td><td>47</td><td>48</td><td>49</td><td>50</td></tr>
</table>
Cross out all the numbers that are not prime numbers.
List the prime numbers between 0 and 50</td>
</tr>
<tr>
<td>recognise and use square numbers and the notation for squared (²).</td>
<td>2^2 or 2 x 2
 

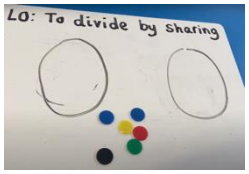
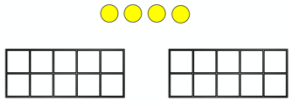
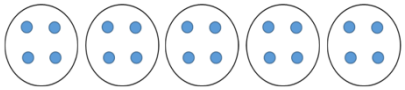
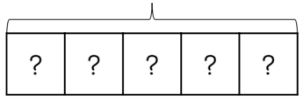
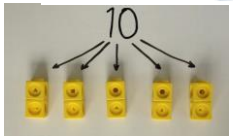
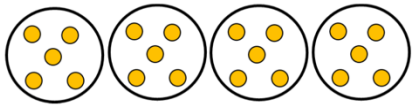
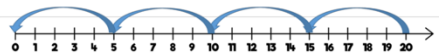

</td>
<td>4^2 or 4 x 4
 
Has to be a whole number.
Has to build a complete square</td>
<td>
<table>
<tr><td>2^2</td><td>2 × 2</td><td>4</td></tr>
<tr><td>2^3</td><td>2 × 2 × 2</td><td></td></tr>
<tr><td>3^2</td><td></td><td></td></tr>
<tr><td>3^3</td><td></td><td></td></tr>
<tr><td>☐²</td><td></td><td>25</td></tr>
<tr><td></td><td>5 × 5 × 5</td><td></td></tr>
</table>
</td>
</tr>
</table>

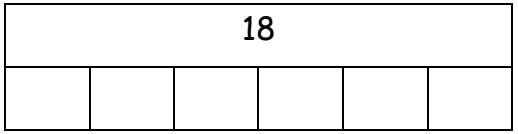
recognise and use cube numbers, and the notation f cubed (^{3})	Use of cubes to practical make a explore cubed numbers. 		

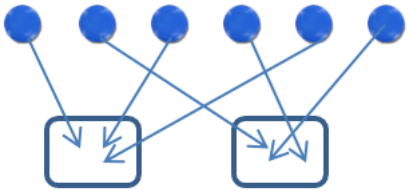
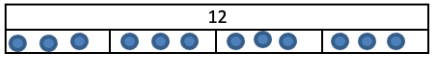
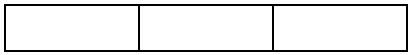
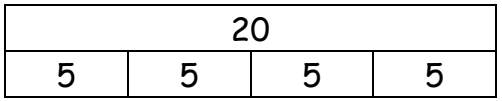
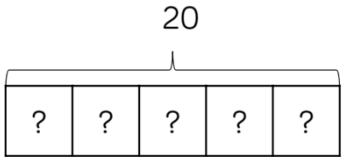
Key Vocabulary to be taught and rehearsed	**Groups of, lots of, times, array, altogether, multiply, multiplied by, repeated addition, sets of, equal groups, times as big as, commutative, product, multiples of, scale up, inverse, derive, factor pairs, composite numbers, prime number, factors, squared, cubed**		
Year 6 Multiplication Objectives	**Concrete**	**Pictorial**	**Abstract**
Multiply multi-digit numbers up to 4-digits by two 2-digit whole numbers using the formal written method of long multiplication		When multiplying 4-digits by 2 digits children should be confident in the written method – if not see Year 5 methods . If they are still struggling times tables provide multiplication grids to support when they are focusing on the use of the method. Ensure the exchanged digits and places and make sure this is consistent	
Identify common factors, common multiples and prime numbers	Factor sandwiches with numicon- Write the factors and the pairs. If it has one pair, then it is a prime number.  	

Section 7: Division at Alderman's Green

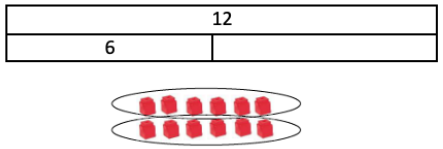
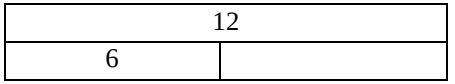
Key Vocabulary to be taught and rehearsed	**share, it's a fair share, it's not a fair share, half, equal groups,**		
EYFS Division objectives	**Concrete**	**Pictorial**	**Abstract**
To understand how quantities can be distributed equally	   Opportunities for hands on sharing experiences in the provision	 Bar model with pictures to support understanding of finding 2 equal parts of a number, to further understand how to halves make a whole.	There are 6 cakes. Can you share them? Try saying "one for me, one for you" 

Key Vocabulary to be taught and rehearsed	**Share; half; the same as; how many/much; equal; share equally; one each, two each etc; group; groups of; lots of; array it's a fair share, it's not a fair share.**		
Year 1 Division objectives	**Concrete**	**Pictorial**	**Abstract**
To understand division through sharing (Partitive division)	  Use of counters, cubes and objects to support concrete approach.	 20 ÷ 5 = 4 20 	Mr Ellis has 9 sweets, and he shares them with his 3 friends. How many sweets does each friend get? 9 ÷ 3 = 3  Children solve problems by sharing amount into equal groups.
To understand division through grouping (Quotient division)	How many groups of 3 can be made with 9 stars?  	There are 20 apples altogether. They are put in bags of 5? How many bags are there? 	Children solve problems by grouping and counting the number of groups. Grouping encourages children to count in multiples and links to repeated subtraction on a number line.  20 ÷ 5 = 4

Solve one-step problems involving division by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	There are 12 stars. How many groups of 4 can be made with 12 stars? 	There are 6 pupils on this tables and there are 18 pieces of fruit to shar between us. If we them equally how many will we each get? 

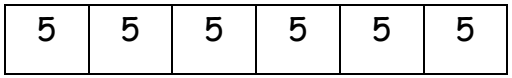
Key Vocabulary to be taught and rehearsed	**Share; half; the same as; how many/much; equal; share equally; one each, two each etc; group; groups of; lots of; array; divide; divided by; division; grouping; number line; left, left over**		
Year 2 Division objectives	**Concrete**	**Pictorial**	**Abstract**
To understand division through sharing (Partitive division)		 12 ÷ 4 = 3 Use of bar modelling to support.	Mr Ellis has 9 sweets, and he shares them with his 3 friends. How many sweets does each friend get? 9 ÷ 3 = 3  Children solve problems by sharing amount into equal groups.
To understand division through grouping (Quotient division)	There are 6 sweets, how many people can have 2 sweets each?  Use of counters, cubes and objects to support concrete approach.	There are 20 apples altogether. They are put in bags of 5? How many bags are there?  <table><tr><td colspan="4">20</td></tr><tr><td>5</td><td>5</td><td>5</td><td>5</td></tr></table>	There are 20 bananas altogether. How many monkeys can have 4 bananas each?  <table><tr><td colspan="5">20</td></tr><tr><td>?</td><td>?</td><td>?</td><td>?</td><td>?</td></tr></table>

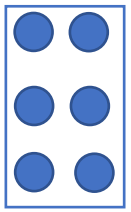
<table>
<tr>
<td>Children will be show the array to represent division and making links to multiplication.</td>
<td colspan="2">This array represents:
12 ÷ 3 = 4 – posed as how many groups of 3 are in 12

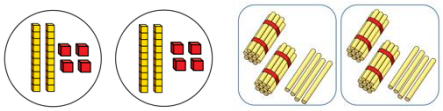
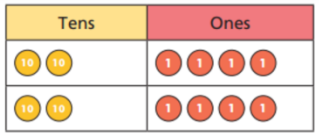
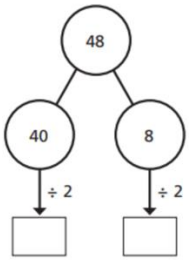
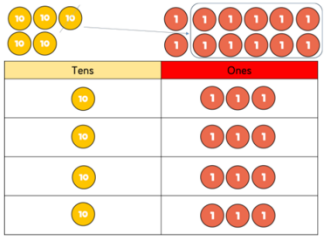
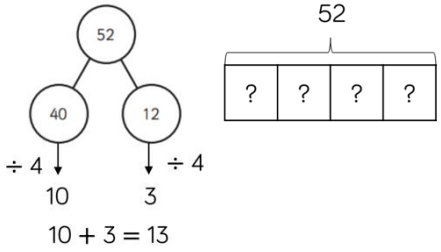
Children understand that the same array can represent 12 ÷ 4 = 3 if grouped horizontally.
  </td>
<td>15 ÷ 5 =
21 ÷ 3 =</td>
</tr>
<tr>
<td>Children will solve one-step division problems (including missing number problems) using concrete objects and pictorial representations</td>
<td> 
</td>
<td>12 ÷ _____ = 6
 
</td>
<td>12 ÷ _____ = 6

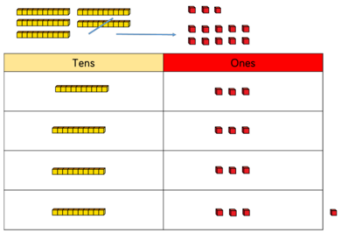
Children to use their knowledge of their times tables</td>
</tr>
<tr>
<td>Solve problems involving division using materials, arrays, division facts including problems in contexts.</td>
<td colspan="3">A classroom has 6 tables.

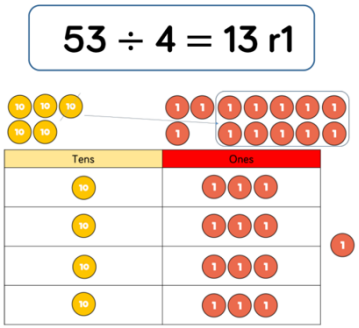
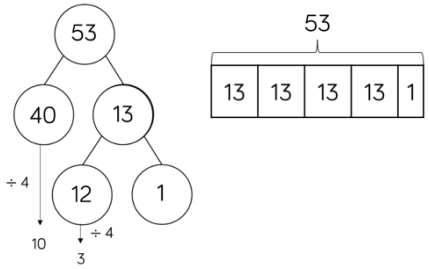
Each table has 5 children sitting at it.

Complete the number sentence to show how many children there are altogether.
 
 

 
Children could draw pictorial representations to help understand questions of this nature.</td>
</tr>
</table>

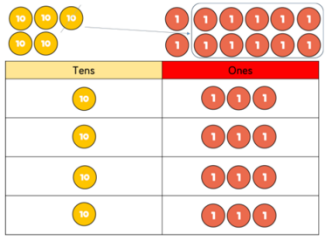
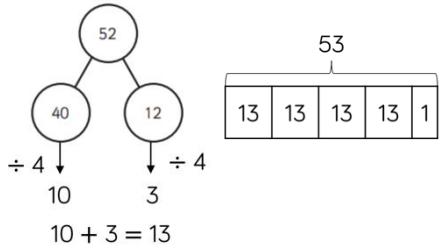
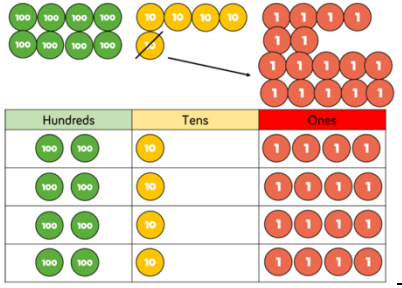
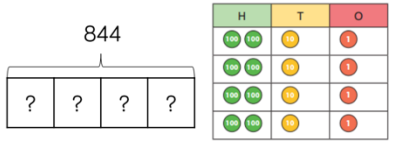
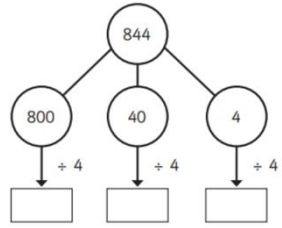
Key Vocabulary to be taught and rehearsed	**share, share equally, one each, two each..., group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over,**		
Year 3 Division objectives	**Concrete**	**Pictorial**	**Abstract**
Divide 2 digits by 1-digit (no exchange)	48 ÷ 2 =  When dividing larger numbers, children can use manipulatives that allow them to partition into tens and ones.	48 ÷ 2 = 	
Divide 2 digits by 1 digit (sharing with exchange)	 Children should start with the equipment outside place grid before sharing the tens and ones equally between the rows.	52 ÷ 4 = 	

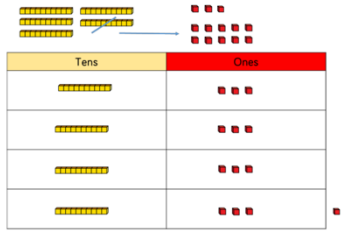
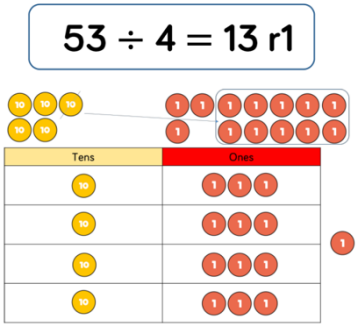
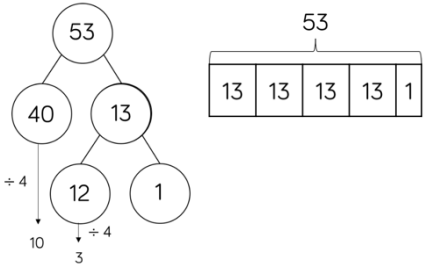
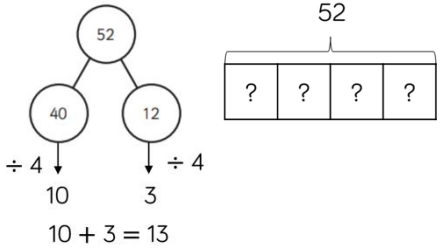
<table>
<tr>
<td>Divide 2 digits by 1 digit (sharing with remainders)</td>
<td>53 ÷ 4 = 13r1
 

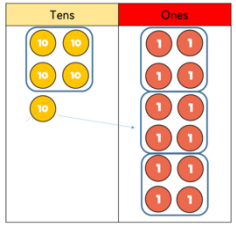
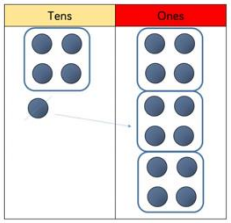
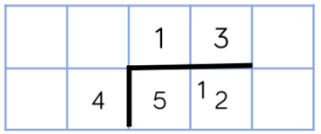
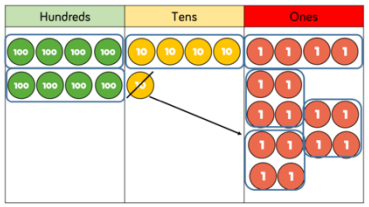
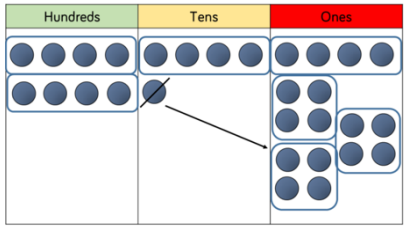
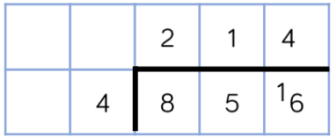
Use of base 10. Start with equipment outside the place value grid. This will highligth any remainders as they will be left outside the grid once the equal groups have been made.</td>
<td> 
</td>
<td> 

Flexiblie partitioning in a part whole model supports this method.</td>
</tr>
<tr>
<td>Write and calculate mathematical statements for division using the multiplication tables they know</td>
<td>  </td>
<td>Link division to multiplication by creating an array and thinking about number sentences that can be created.
E.g. 15 ÷ 3 5 x 3 = 15
15 ÷ 5 3 x 5 = 15</td>
<td>If you know 7 x 4 = 28. What else do you know?

4 x 7 = 28
28 ÷ 4 = 7
28 ÷ 7 = 4
28 = 4 x 7</td>
</tr>
</table>

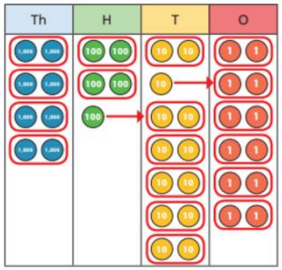
Key Vocabulary to be taught and rehearsed	**share, share equally, one each, two each..., group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, division facts, inverse, derive**		
Year 4 Division objectives	**Concrete**	**Pictorial**	**Abstract**
Divide 2 digits by 1-digit by sharing.	 Children should start with the equipment outside place grid before sharing the tens and ones equally between the rows.	52 ÷ 4 = 	
Divide 3 digits by 1-digit by sharing	844 ÷ 4 = 221 	844 ÷ 4 = 211  Place value counters to share 3-digit numbers into equal groups.	 Flexible partitioning in a part whole model support this model.

Divide 2 digits by 1 digit (sharing with remainders)	53 ÷ 4 = 13r1  Use of base 10. Start with equipment outside the place value grid. This will highligth any remainders as they will be left outside the grid once the equal groups have been made.	 	 Flexiblie partitioning in a part whole model supports this method.
Divide 2 digits by 1 digit (sharing with exchange)	 Children should start with the equipment outside place grid before sharing the tens and ones equally between the rows.	52 ÷ 4 =  	

Key Vocabulary to be taught and rehearsed	**share, share equally, one each, two each..., group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, product, division facts, inverse, derive, formal written method.**		
Year 5 Division objectives	**Concrete**	**Pictorial**	**Abstract**
Divide 2 digits by 1 digit (regrouping)	 **52 ÷ 4 = 13**  When using the short division method children use grouping. Starting with the largest place value they group by the divisor. Children should consider 'How many groups of 4 tens can we make? and 'How many groups of 4 ones can we make? Remainders can also be seen as they are left ungrouped.	 Children should be exposed to the concrete and pictorial before moving on to this stage to develop help develop a deeper understanding on the skill.
Dividing 3 digits by 1 digit (regrouping)	  Children continue to use place value counters on a place value grid. Children can also draw their counters and group them through a more pictorial method.	**856 ÷ 4 = 214** 

Divide 4 digits by 1-digit numbers

8,532 ÷ 2 = 4,266



Place value counters or counters can be used on a place value grid to support children to divide 4-digit by 1 digit. They can also draw their own counters and group them through a more pictorial method.

Children should be encouraged (when ready) to move away from concrete and pictorial when dividing numbers with multiple exchanges.

8,532 ÷ 2 = 4,266

	4	2	6	6
2	8	5	$^{1}3$	$^{1}2$

Dividing by 10, 100 and 1000

Gattegno chart and counters to explore dividing by 10, 100 and 1000

10,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000	90,000
1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009

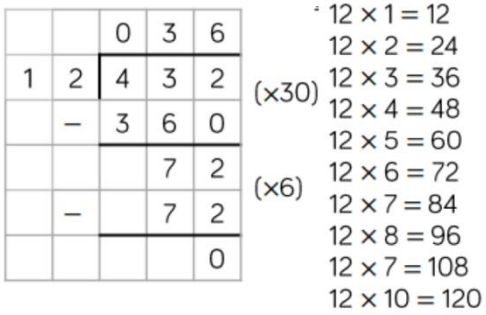
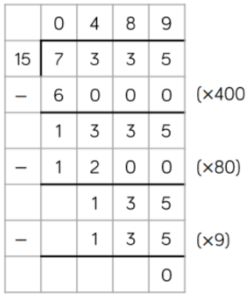
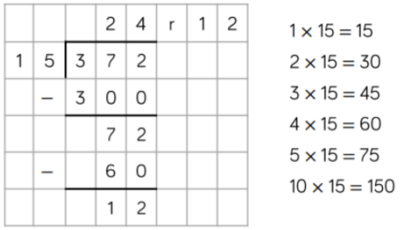
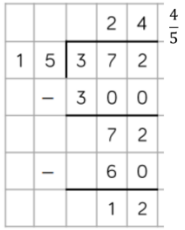
768,000 ÷ 1000

HTh	TTh	Th	H	T	O
7	6	8	0	0	0

32.5 ÷ 100

H	T	O	Tths	Hths	Thths
	3	2	5		

Number	Number divided by 10	Number divided by 100	Number divided by 1,000
65,000			
	7,200		
		3,500	

Key Vocabulary to be taught and rehearsed	**share, share equally, one each, two each..., group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, product, division facts, inverse, derive, formal written method.**		
Year 6 Division objectives	**Concrete**	**Pictorial**	**Abstract**
To divide numbers up to 4 digits by a two-digit whole number using formal written method of long division (interpret remainders as whole number remainders, fractions or by rounding as appropriate for the context.	**432 ÷ 12 = 36**  $12 \times 1 = 12$ $12 \times 2 = 24$ $12 \times 3 = 36$ $12 \times 4 = 48$ $12 \times 5 = 60$ $12 \times 6 = 72$ $12 \times 7 = 84$ $12 \times 8 = 96$ $12 \times 7 = 108$ $12 \times 10 = 120$	**7,335 ÷ 15 = 489**  $1 \times 15 = 15$ $2 \times 15 = 30$ $3 \times 15 = 45$ $4 \times 15 = 60$ $5 \times 15 = 75$ $10 \times 15 = 150$	Children can also divide 2 digit numbers using long division. Children can write out multiples to support their calculations with larger remainders. Children will also solve problem with remainders where the quotient can be rounded as appropriate.
To divide numbers up to 4 digits by a two-digit whole number using formal written method of long division (interpret remainders as whole number remainders, fractions or by rounding as appropriate for the context.	**372 ÷ 15 = 24 r12**  $1 \times 15 = 15$ $2 \times 15 = 30$ $3 \times 15 = 45$ $4 \times 15 = 60$ $5 \times 15 = 75$ $10 \times 15 = 150$	**372 ÷ 15 = 24 $\frac{4}{5}$** 	When a remainder is left at the end of the calculation, children can either leave it as a remainder or convert it to a fraction or decimal. This will depend on the context of the question. Children can also answer questions where the quotient needs to be round according to the context.

To divide numbers up to 4 digits by a two-digit number using a formal written method of short division.

7,335 ÷ 15 = 489

	0	4	8	9
15	7	$^{7}3$	$^{13}3$	$^{13}5$

15	30	45	60	75	90	105	120	135	150

To solve 4 digits by 2 digits written methods become the most accurate.

Children can write out multiples to support their calculations with large remainders.

Children will also solve problem with remainders where the quotient can be rounded as appropriate.

Section 8: Glossary – Four operations.

Addition

Addend	A number to be added to another
Aggregation	Combining two or more quantities or measures to find a total
Augmentation	Increasing a quantity or measure by another quantity
Bridging	When a calculation causes you to cross a 'ten boundary' or a hundred boundary e.g. 85 + 18 will bridge 100.
Commutative	Numbers can be added in any order.
Complement	In addition, a number and its complement make a total e.g. 300 is the complement to 700 to make 1,000
Partitioning	Splitting a number into its component parts.
Sum	The results of an addition. Sum should not be used as a synonym for calculation.
Total	The aggregate or the sum found by addition

Subtraction

Difference	The numerical difference between two numbers is found by comparing the quantity in each group
Exchange	Change a number or expression for another of an equal value
Inverse	The opposite operation. For example addition is the inverse of subtraction.
Minuend	A quantity or number from which another is subtracted
Partitioning	Splitting a number into its component parts
Reduction	Subtraction as take away
Subitise	Instantly recognise the number of objects in a small group without needing to count
Subtrahend	A number to be subtracted from another

Multiplication

Array	An ordered collection or counters cubes or other items in a rows and columns.
Commutative	Numbers can be multiplied in any order.
Exchange	Change a number of expression for another of an equal value.
Factor	A number that multiplies with another to make a product. A number that divides exactly into another number, without remainder.
Multiplicand	In multiplication, a number to be multiplied by another.
Multiple	A number which is an exact product of another number e.g. a number which is in the times table of another number.
Partitioning	Splitting a number into its component parts
Product	The result of multiplying one number by another.
Scaling	Enlarging or reducing a number by a given amount called the scale factor e.g 4 x 3 means 4 scaled up by a factor of 3.

Division

Array	An ordered collection or counters cubes or other items in a rows and columns.
Dividend	In division, the number that is divided.
Divisor	In division, the number by which another is divided.
Exchange	Change a number of expression for another of an equal value.
Partitive	When dividing a number into a known number of groups (We want to know how many is in each group)
Quotative	When dividing a number into groups of. (We want to know how many groups)
Quotient	The result of a division.
Remainder	The amount left over after a division when the divisor is not a factor of the dividend
Scaling	Enlarging or reducing a number by a given amount called the scale factor.